The determinants of contraceptive use in Zambia

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ABSTRACT

The contraceptive prevalence rate in Zambia is high, while fertility decline is very slow. Over a period of 15 years from 1992 to 2007, the contraceptive prevalence rate (CPR) increased from 8.9 per cent in 1992 to 32.7 per cent in 2007; and there has been a sharp increase in contraceptive use by women, while total fertility rate (TFR) fluctuated between 6.5 and 6.2. In 1992, TFR was 6.5 and dropped to 5.9 in 2002; however, in 2007 the TFR increased to 6.2.

The study uses three Zambian Demographic and Health Survey (DHS) data sets for 1996, 2001-2 and 2007 and applies multivariate logistic regression techniques to identify factors affecting the use and choice of modern contraceptives by Zambian women. The study seeks to identify how contraceptive use in Zambia influences fertility and why is contraceptive use and fertility high.

We find that there has been an increase in the use of contraceptives over the period. In our results place of residence (urban/rural), age, education, number of living children and formal employment were identified as factors that are significantly related to use of modern contraceptives. Our findings suggest that women's education should be promoted, in order to enhance their decision-making autonomy and their ability to pursue goals other than childrearing, if favourable fertility decisions are to be made in Zambia. There is a need to encourage the greater use of contraception by subsidising modern contraceptives. The low use of contraception by younger women suggests that information, education and communication efforts targeted at youth should address these problems, and contraception should be made available to younger women, including those who are still in school.

An analysis of rural-urban differential use of contraceptives showed that despite the high use of contraception by both urban and rural women, rural fertility decline is lagging behind urban fertility.

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1 INTRODUCTION

1.1 Background

Frank and Bongaarts (1991) regarded contraceptive use as the key determinant for most worldwide fertility transitions. Many authors, (for example, Benefo (2010), Ezeh (1997) Gage (1995), Shapiro and Tambashe (1994), Mahmood and Ringheim (1996), National Research Council (1993), Yeatman and Trinitapoli (2008)) have looked at the determinants of contraceptive use in sub-Saharan Africa. Gage (1995) analysed the importance of women's economic power and individual control over choice of pattern to their contraceptive behaviour, Shapiro and Tambashe (1994) also looked at the impact of women's education and employment on contraceptive use. This research examines the determinants of women's contraceptive use using a multivariate framework. Benefo (2010) conducted multilevel analysis to assess the influence of individual characteristics and community characteristics such as levels of development and contraceptive availability on condom use in Zambia. In this research we are not going to restrict our dependent variable to only one modern method of contraception but we will look at all the methods of modern contraception in Zambia.

However, Zambia has been characterized by a very slow decline in fertility over the past 30 years, with a total fertility rate of 7.2 in the 1980 census and 6.2 in the 2007 Demographic Health Survey. This was paralleled by an increase in contraceptive use, from 15% in 1996 and 34% in 2001-2002, to 41% in 2007 (Central Statistical Office (CSO) and University of Zambia 2009).

Overall fertility has therefore fallen by only one child per woman in 27 years, while contraceptive use has nearly tripled.

This investigation seeks to understand why there has been such an increase in contraceptive use, while fertility has declined slowly. It does so by looking at the determinants of contraceptive use in Zambia over the period 1996 to 2007.

1.2 Statement of the problem

This research examines the determinants of contraceptive use in Zambia, by using the data from recent Demographic and Health Surveys. It examines the nature of the relationship between a number of known mediating factors and fertility choices of women in Zambia. Factors that determine the use of contraception that will be analysed in the study include: woman's education, woman's employment, age of respondents,

number of living children, desire for more children, marital status, type of marital union, religion, ethnicity, husband/partner's education and employment.

It is important to have knowledge of differentials in the use of contraceptives in Zambia so that the subgroups that have low usage of contraceptives are identified and appropriate interventions can be made. It is also important to identify subgroups that have high usage and analyse their characteristics and look at reasons why they have high usage of contraceptives in order to decide if it is possible to implement what is causing high usage of contraceptives to subgroups with low usage.

1.3 Objectives of the study

This study has two objectives. The first is to examine factors that influence women's choice and use of contraception by using a multivariate logistic regression model. The second is to examine whether different factors are associated with the use of contraceptives by place of residence (urban/rural). There is a need to know, in particular, which population subgroup is influencing the change in contraceptive use in Zambia, or has significantly high levels of contraceptive use. It is also important to know which factors are influencing that subgroup and not influencing the other; hence, the need to split the population into rural and urban categories. This will assist policy makers in the kind of programmes to apply, in order to increase contraceptive use and hence to promote fertility decline in Zambia.

1.4 Dissertation outline

The dissertation is made up of five chapters. Chapter 2 reviews the literature on the use of contraception in sub-Saharan Africa, determinants of contraceptive use and contraceptive use in Zambia. In Chapter 3, we analyse the data from the three Zambian Demographic and Health Survey (ZDHS) data sets; and comparisons are done to check for consistency. In Chapter 4, the logistic regression models results are presented and discussed. Chapter 5 concludes the dissertation by summarising the findings and discussing the limitations and recommendations.

2 LITERATURE REVIEW

This chapter reviews the literature on contraceptive use in sub-Saharan Africa and Zambia; section 2.1 reviews contraceptive use in sub-Saharan Africa; section 2.2 looks at the determinants of contraceptive use; while the last section 2.3, discusses contraceptive use in Zambia.

2.1 Introduction

According to Bongaarts and Potter (1983), contraceptive use is one of the four proximate determinants of fertility; the other three being induced abortion, postpartum infecundability, and the proportion of women married. The high degree of correlation between contraceptive use and the total fertility rate (TFR) indicates that an increase in contraceptive use is the main cause of the decline in fertility (Bongaarts 1986).

Factors affecting contraceptive use can be analysed by focusing on individual and household factors, or on contextual factors, such as community-level cultural beliefs, the quality of health services, the infrastructure of the area and macro-economic factors. Tawiah (1997), Uchudi (2001), White and Speizer (2007), Oheneba-Sakyi and Takyi (1997), focused on individual and household level factors, while Benefo (2010), Paek, Lee, Salmon *et al.* (2008), Stephenson, Baschieri, Clements *et al.* (2007), Stephenson, Beke and Tshibangu (2008) focused on both individual and contextual factors by using multilevel models.

Examining community influences, in an attempt to analyse and expand women's reproductive health choices, is essential since the individuals' decision to adopt contraception is influenced by factors beyond the household level, but this is often without limitations. Stephenson et al. (2007) employed multilevel logistic regression techniques to Demographic Health Survey (DHS) data in six African countries. These authors examined the role of community-level factors, such as cultural beliefs, approval of family planning, female education attainment, community household amenities index, religious composition, mean number of children per woman in the community, HIV testing in the community, mean age at marriage for females, transport infrastructure to explain the geographic variations in modern contraceptive use. The study found that, in addition to demographic and socio-economic factors, contextual factors play a significant role in creating geographic variations.

By applying multilevel analysis, researchers normally encounter problems in examining community influences, for example community factors are either not commonly collected in surveys, or they are less tangible factors that are difficult to quantify (Stephenson, Beke and Tshibangu 2008) and statistically insignificant (Stephenson, Baschieri, Clements *et al.* 2007). The other problem of multilevel analysis is its complex nature, whereby the inclusion of one additional variable often makes the entire model more complicated and harder to interpret (Paek, Lee, Salmon *et al.* 2008). Theoretically, it is better to use multilevel modelling; however, analysing socio-economic and demographic factors at the individual level is more practical.

Tawiah (1997) examined the relationship between demographic variables (age of respondent, number of living children, marital duration), socio-economic variables (woman's education, husband's education, husband's occupation, desire for more children, husband's approval of family planning, respondent's approval of family planning, discussion of family planning with partner, residence, region , religion and ethnicity) and contraceptive use by Ghanaian women. Tawiah (1997) applied multivariate stepwise logistic regression techniques to the 1988 Ghana Demographic Health Survey data. The results showed that women who approved family planning were 3.8 times more likely to use contraceptives than women who did not. Further, women who discussed family planning with partner were 3.4 times more likely to use contraceptives than those who did not. Respondent's level of education was also associated with the use of contraception; women with higher levels of education were three times more likely to use contraceptives than those with lower levels of education.

Oheneba-Sakyi and Takyi (1997) examined the role of men in issues relating to contraception in Ghana. The study examines relations within marriages by looking at factors, such as large age differences between couples and the persistence of polygyny. The results showed that, in general, wives tend to be younger than their husbands; 40 per cent of couples have 10 or more years difference. The relationship between a couple's age difference and the wife's contraceptive use did not show any clear pattern, but there was an inverse relationship between the age differential and the use of contraceptives by husbands.

Of all the women who use contraceptives, 68.6 per cent were in monogamous marriages, while 31.2 per cent were in polygynous marriages. Being in polygynous marriages reduces the use of contraceptives; the results showed that the use of contraceptives in polygynous marriages is less likely to occur than in monogamous

relationships. This might be probably because sex is less frequent in this type of marriage.

2.2 Determinants of contraceptive use in Africa

This section reviews factors that influence the use of contraceptives in Africa.

2.2.1 Age

Age is related curvilinearly to current contraceptive use (Njogu 1991). The hypothesis is that couples are less likely to use contraceptives at the youngest and oldest ages when levels of fecundity are low. At the oldest ages, even among fecund women, contraceptive use declines because of the declining frequency of intercourse (Njogu 1991). Several studies provide evidence that there is higher contraceptive use by middle-aged women compared with other women (Ntshebe 2011; Oheneba-Sakyi and Takyi 1997; Stephenson, Baschieri, Clements *et al.* 2007).

Oheneba-Sakyi and Takyi (1997), using data from the 1988 Ghana DHS, to examine demographic and socio-economic factors that influence contraceptive use, concluded that younger women are less likely to use contraception than older women. There is also evidence to suggest that older women are less likely to use contraception than middle-aged women. Stephenson *et al.* (2007) applied multilevel logistic regression techniques to DHS data from six African countries to explore the factors contributing to differences in contraceptive use at individual, household, and community levels. They found that in Kenya, Malawi and Tanzania, the use of contraception is high among 30-39 women compared with older women of 40-49 years.

Ntshebe (2011) investigated whether current contraceptive use among married couples in Malawi is affected by the couple's concerns about HIV/AIDS. The results showed that older women (35-49 years) were less likely to use contraception than middle aged women (25-34 and 19-24).

2.2.2 Place of residence

The place of residence (rural/urban) has an impact on the use of contraceptives. Contraceptive use is expected to be higher among women living in urban areas, compared with those in rural areas, because urban areas in sub-Saharan Africa are associated with better education and by easier access to public and private medical care. The National Research Council (1993) identified that in several African countries, urban areas exhibit higher contraceptive prevalence compared with rural areas. Burgard (2004) in her study comparing patterns and predictors of racial differences in modern contraceptive use in the late apartheid period and the post-apartheid period, found that

the use of modern contraceptives by black women is lower in rural areas than it is in urban areas.

2.2.3 Women's education

Women's education has been found to be a more significant determinant of contraceptive use than any other socio-economic determinants. Formal education has been used as an overall measure of women's socio-economic position in several studies of contraceptive use in sub-Saharan Africa, because it is readily available in many data sets, and it is easy to measure (Gage 1995). Several studies reflect that women's education has a strong positive impact on contraceptive use (Burgard 2004; Guilkey and Jayne 1997; Njogu 1991).

Education changes the values of women from traditional to modern values that favour having small families. In terms of their fertility decisions, women tend to follow beliefs that promote self-advancement rather than childbearing. Educated women are conscious of the child costs and benefits of small families, leading to the adoption of contraception to limit, and postpone childbearing. The contribution of education to literacy means that these educated women have more access to information about the advantages and importance of small families and the use of contraception.

Easterlin (1975) said that there are subjective (psychic) costs and objective (market) costs of contraception. Better-educated women have a more positive attitude towards contraception; therefore, they experience less subjective costs, since they are in a good position to look for and read information on the use of contraceptives.

2.2.4 Husband/partner's education

Research on the relationship between husband's education and contraceptive use is inconclusive (Gubhaju 2009). Most countries in Sub-Saharan Africa are characterised by a patriarchal society, where the involvement of both husband and wife in contraceptive decisions has led to the husband's domination in decisions regarding whether to use contraception and which methods to use (Caldwell and Caldwell 1987). Men's involvement in reproductive decision-making in the African household is most likely to have a positive impact, especially if they are supportive of their wives' decisions and choices. As in women's education, male education lowers fertility by increasing men's consciousness of child costs and the benefits of small families, leading to the adoption of contraception.

Uchudi (2001) asserts that it is hard for a wife with a few years of schooling to stop childbearing without the support of a husband with some education. He argues that

the impact of a married woman's education in the adoption of modern contraceptive use is made up of the net effect of the wife's education and the net effect of the husband's education. Although the husband's education influences the adoption of contraception, the husband's education does not negate the fact that the wife's education is more important in the adoption of modern contraceptive in developing countries (Uchudi 2001).

2.2.5 Woman's employment

Studies have highlighted the importance of women's employment in their behaviour regarding the use of contraceptives (Gage 1995; Shapiro and Tambashe 1994). Employment is expected to influence the family size that women desire, and hence their contraceptive behaviour (Shapiro and Tambashe 1994). Women who are employed are more likely to use contraception than those who are not. The economic and opportunity costs associated with raising children are high. Employed women are less motivated to have children, because it is difficult for them to balance child rearing and work obligations. Most of these women in sub-Saharan Africa are found in urban areas, where the conditions are not conducive to raising too many children. For example, there is no extended family to help with raising children while the woman is working, unlike in the traditional settings where the extended family is there to give a hand in the raising of children.

Employed women have economic resources that give them power to make their own decisions of self-advancement, thereby breaking traditional beliefs in the importance of large families (Caldwell 1982). Women who are formally employed can come into contact with other women with small families and be exposed to modern family planning. These women have access to new ideas and values; therefore, they are motivated to adopt contraception in order to have fewer children (Uchudi 2001).

The results of the analysis done by Gage (1995) in Togo confirm the importance of women's economic power obtained from employment for widening their contraceptive options. The results showed that women who participated in rotating credit or saving schemes and women who worked for cash were significantly more likely to have used traditional and modern methods of contraception compared with women who worked, but were not reimbursed with cash. The analysis also revealed that women who participated in rotating credit or saving schemes were more likely to use contraception than women who worked for cash. This finding suggested that while working for cash could increase women's autonomy and enable them to make decisions

regarding their fertility, engaging in programmes that enable them to be economically secure might be more relevant to an increase in contraceptive use.

Shapiro and Tambashe (1994) analysed the impact of women's employment on contraceptive use, by making a distinction between informal and formal sector employment. Women who are employed in the formal sector were found to use contraception more than women in the informal sector. Women in the informal sector might be able to combine employment and child care, while those in the formal sector have more opportunities to deal with the costs of childbearing; and hence, the higher motivation for contraception.

2.2.6 Husband/partner's employment

Uchudi (2001) argues that employed men aspire self-advancement, as do women, and they are more sensitive to the costs of children, thereby affecting the relationship between men's occupation and their wives' fertility choices and behaviours. The assumption is that a woman with a husband who is employed is more likely to opt for fewer children, and to adopt a modern method of contraception than other women.

2.2.7 Type of marital union

Women in polygynous unions are less likely to use contraception, because the competition among co-wives may result in these women being less likely to use birth control (Aborampah 1987; Ahmed 1986; Audu, Yahya, Geidam *et al.* 2008). On the other hand Peterson (1999) argues that as societies shift to monogamy from polygyny, there is the adoption of contraception and a significant decline in fertility. It is not clear whether polygyny increases or lowers fertility in the literature, probably because of the complexity of cultural and socio-demographic influences (Audu, Yahya, Geidam *et al.* 2008; Peterson 1999). Audu et al. (2008) in their study comparing contraceptive use among women in monogamous and polygynous marriages in Nigeria identified that women living in rural areas were less likely to use contraception when in polygynous marriages than in monogamous marriages. The results of this study also showed that contraception was more widely used by women in monogamous than in polygynous marriages.

Audu *et al.* (2008) also analysed the influences of socio-economic factors on contraceptive use in relation to the type of marriage (polygyny/monogamy). There was a statistically significant association between polygyny and the non-utilisation of contraception by women who were 35 years and older, and women with four or more children. This was an indication of competition among co-wives, since from the

literature, in general, older women and women with more children are more likely to use contraception than younger women and women with fewer children.

Peterson (1999) in her study of marriage structure and contraception in Niger found that polygynous wives were older, less likely to have been to primary school or to work outside the home, and had given birth to one or more children compared with monogamous wives, and were married to older men who were less likely to have gone to primary school compared with men in monogamous marriages. Polygynous women, in Peterson (1999) study, desired a larger number of children than monogamous women; and they were less likely to discuss family size and the use of contraceptives.

2.2.8 Religion

Coale (1986) and Lesthaeghe (1980) reveal the importance of religious values on contraceptive use and fertility transition. Coale (1986) observes out that the acceptance of birth control was one of the necessary conditions for a major decline in marital fertility. Lesthaeghe (1980) argued that, in England, the church's gradual acceptance of birth control allowed fertility levels to fall.

There are two schools of thought on the effect of religion on contraceptive use. One perspective is that, irrespective of religious affiliation, people with the same socio-economic and demographic characteristics should have identical fertility limitations and practices (Addai 1999a; Goldscheider and Mosher 1988). As an example, the impact of religion on contraceptive use may be influenced by urban and rural differentials in access to health and family planning services (Addai 1999a). Religious groups found in urban areas are more exposed to outside ideas and can easily accept family limitation practices and behaviour (Addai 1999a). Some studies emphasise the importance of the independent effect of religion on contraceptive use (Caldwell and Caldwell 1987; Heaton 2011).

Differences in contraceptive use by religious groups are due to differences in religious norms on family size, for example there is some evidence that Muslims have larger families than other religious groups (Heaton 2011). Heaton's study emphasises that differences in contraceptive use by religious groups is because some religious groups believe that contraceptive use is not acceptable, while also showing that the prevalence of contraceptive use in Muslims is lower than it is in Christians. The Muslim/Christian difference in the use of contraception becomes wider at higher levels of development. Christian groups can easily change their attitudes towards childbearing compared with Muslim groups.

2.2.9 Ethnicity

Addai (1999b) emphasised that it is essential to understand whether ethnic variations in contraceptive use are caused by socio-economic and demographic disparities among the groups, or whether such differences reflect the values, norms, beliefs, ideals and doctrines of the ethnic groups. Differences in contraceptive use based on ethnicity result from socio-economic and demographic differences, such as levels of female employment, age at marriage, female employment and female education, among other characteristics (Cochrane 1979).

When these differences are controlled, then variations in contraceptive use among ethnic groups should also disappear (Addai 1999b). An alternative explanation to ethnic differences in the use of contraceptive attributes these differences to the role of ethnicity, independently of socio-economic and demographic characteristics (Caldwell and Caldwell 1987; Caldwell, Orubuloye and Caldwell 1992). This explanation suggests that the resistance to the means of fertility regulation is, at least partly, culture-determined (Addai 1999b). Differences in the prevalence of polygyny, duration of breastfeeding, duration of post- partum sexual abstinence may influence differences in reproductive behaviour and contraceptive use among ethnic groups (Benefo, Tsui and Johnson 1994; Bongaarts, Frank and Lesthaeghe 1984). Addai (1999b), in his study to examine differentials in contraceptive use in six ethnic groups in Ghana, found that contraceptive use differentials by ethnic groups can be accounted for by differences in socio-economic and demographic characteristics. Ethnic differentials in contraceptive women in this study were attributed to other characteristics such as age, education, occupation, place of residence, age at first marriage and number of living children that distinguish the ethnic groups.

Shapiro and Tambashe (1994) in their study of contraceptive use in Zaire showed that Ubangi and Mongo women had relatively high rates of modern contraceptive use. Gage (1995) analysed contraceptive behaviour in Togo women and found that Kabye-Tem and Para-Gourma women were less likely to use contraception than the Adja-Ewe, to discuss family planning with their spouses and to use contraception.

2.2.10 Desire for more children and number of living children

It is believed that women who want more children and those who are undecided have a lower use of contraceptives than those who do not want more children. In most African countries, spacing is more important as the motivation for using contraception (Njogu 1991), on the other hand Timaeus and Moultrie (2008) argue that fertility regimes that have very long birth intervals can only be explained by widespread postponement of

birth not spacing of births. Shapiro and Tambashe (1994) argue that the expressed desire not to have a child is a proxy measure of the respondent's motivation towards spacing. They also found that the relationship of this desire to use contraceptive is highly significant in their study of the impact of women's employment and education in Kinshasa.

The number of living children captures the relationship between contraceptive use and child mortality. Women who have experienced the death of a child use less contraception than those with more living children (Njogu 1991). On the other hand, women with more children are most likely to be burdened by the costs of having children; therefore, they might decide to limit any further childbearing (Uchudi 2001).

2.3 Contraceptive use in Zambia

Family planning efforts in Zambia were initiated by a non-governmental organisation called Family Planning Welfare Association of Zambia, formed in 1972. This organisation met opposition from large religious groups led by the Women's League and the Catholic Church. It was only until the mid 1980s when the United Nations Population Fund (UNFPA) successfully convinced key individuals, that a policy coalition in favour of family planning began to form (Lee, Lush, Walt *et al.* 1998).

Solo, Luhanga and Wohlfahrt (2005) summarise the family planning programme in Zambia over twenty years, from 1982 to 2002. They point out that Zambia's high fertility resulted from high levels of child and infant mortality, the desire for large families, low education levels, and low levels of family planning knowledge and use. The population policy of 1989 signalled a change in attitudes towards family planning; people realised that the overall economic development depended on lowering fertility. After the mid-1990s interventions sought to expand the use of contraceptives and to overcome any biases against Depo Provera, which had been banned in 1982.

Depo Provera was finally officially accepted in 2004. The launch of the Family Planning in Reproductive Health: Policy Framework, Strategies and Guidelines enhanced the choice and improved the services of contraception. The policy addressed barriers to services, such as spousal consent, age and parity restrictions. Social marketing through the Society for Family Health contributed significantly to the use of contraceptives in Zambia. This programme saw an increase in the use in condoms and oral contraceptives.

Innovative strategies, including involving the community such as peer counsellors, were also incorporated; and the strategies were successful on a fairly small scale.

It appears that the use of contraception has had only the smallest impact on fertility decline in Zambia. The effectiveness of contraception depends on whether it is traditional or modern, while the use of modern contraception is mainly responsible for fertility decline (Letamo and Letamo 2001). Traditional methods of contraception are used by a significant number of women in Zambia. In 1996 about 12 per cent of Zambian women were using traditional methods of contraception, while about 15 per cent of the fertility decline was caused by traditional methods of contraception (Central Statistical Office (CSO) 1997). If some of the women who are using traditional methods had used modern methods, a greater than 15 per cent of fertility decline would have been achieved given that the use of modern contraception is mainly responsible for fertility decline.

For a woman to be given contraceptives in Zambia her husband was supposed to give his permission; spousal consent was required by law, until 2005 (Ashraf, Field and Lee 2010). Although women are no longer officially required to have permission from their husbands to obtain contraceptives through public hospitals, health-care providers in rural Zambia still commonly refuse to give contraceptives to women without their husbands' consent. In urban areas, this practice has been reported for long-term methods, like implants and IUDs (Ashraf, Field and Lee 2010).

The family planning programme has been, and is still largely, the responsibility of non-governmental organisations. All these conditions have caused the fertility decline to be very slow in Zambia (Letamo and Letamo 2001).

Most family planning programmes in Zambia use mass media to encourage men and women to use contraceptives. The reproductive health and social marketing campaigns in Zambia reached a large proportion of the population and had a significant impact on the use of condoms (van Rossem and Meekers 2007).

Data from DHS in Zambia and other countries show that men report large ideal family sizes and a lower demand for contraception than from their wives (Ashraf, Field and Lee 2010); and also data from qualitative studies in Zambia indicate that women sometimes hide the use of contraceptives from their partners (Biddlecom and Fapohunda 1998; Castle, Konate and Ulin 1999). A study done in Zambia by Ashraf et al. (2010) showed that the rates of contraceptive use would increase in response to simple changes in institutional features that could increase women's autonomy over birth control. Reduction in the number of unwanted births in women who were given access to significantly cheaper and more convenient forms of birth control was only

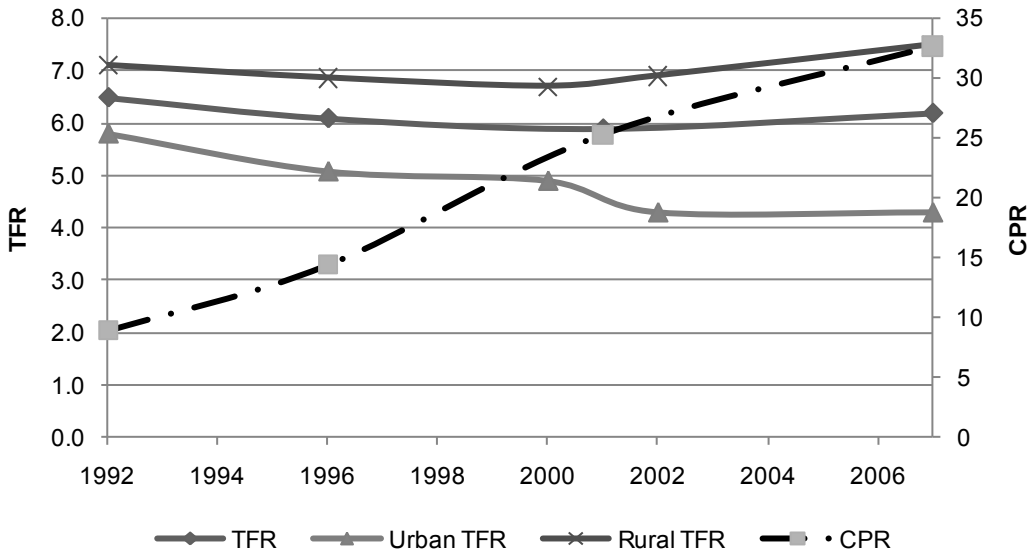
experienced when they were also given full autonomy over accessing these new methods.

The contraceptive prevalence rate in Zambia is high, while fertility decline is very slow. Figure 2.1 below displays TFR and contraceptive prevalence rate (CPR) over a period of 15 years from 1992 to 2007. The CPR increased from 8.9 per cent in 1992 to 32.7 per cent in 2007; and there has been a sharp increase in contraceptive use by women, which is paralleled by TFR fluctuating between 6.5 and 6.2. In 1992, TFR was 6.5 and dropped to 5.9 in 2002; however, in 2007 the TFR increased to 6.2.

Contraceptive use amongst rural women is relatively high; and according to the 2007 DHS report, more than one third of rural women are using contraceptives (37 per cent), although urban women use more contraception (48 per cent) (Central Statistical Office (CSO) and University of Zambia 2009).

This suggests that contraceptive use is higher for both urban and rural women, while the fertility is declining slowly in rural areas compared with urban areas. Figure 2.1 shows that there was a decline in urban TFR between 1980 and 2007; while the TFR in rural areas remained almost constant over the same period, and consequently moderated the rate of decrease of the overall fertility.

Figure 2.1 TFR and CPR in Zambia from 1992 to 2007



Source: Derived from ZDHS 1996, 2001-2 and 2007

In an attempt to analyse the differentials in contraceptive use between urban women and rural women in Zambia, White and Speizer (2007) used the 2001-2 Zambian

Demographic Health Survey data to examine factors associated with contraception, by using logistic regression techniques. They used separate models for urban and rural women to see if different factors were associated with use according to residence. They identified that contraceptive use differed between rural couples and urban couples.

Urban dwellers were 1.56 times more likely to use contraceptives than women from rural areas. In urban areas, women aged 35 and older were significantly less likely to use any contraceptives than younger women 15-24 who are sexually active and fecund; while in rural areas, younger women (15-24) and older women (25-34) were less likely to use contraceptive methods. The main urban-rural difference was that women who were visited by a health worker in rural areas were more likely to use contraception, while the relationship for urban women was not significant. Consistent results across both urban and rural areas included the number of living children, which was significantly associated with contraceptive use, the education level – where women with less education were less likely to use contraception. Women who wanted to limit their number of children were 3.5 times more likely to use contraception than women who wanted more children.

Recently authors have concentrated their attention on the determinants of condom use in Zambia (Benefo (2010), Benefo (2004)) since condoms prevent both pregnancy and the spread of HIV/AIDS and STIs. Chikamata et al. (2002) argue that in countries with high rates of HIV and other STIs, a reproductive health approach must include some degree of integration with STI services and traditional family planning services. This integration will help in fighting HIV at the same time help improve fertility decline. Benefo (2010) used multilevel modelling to assess the influence of the personal characteristics of individuals, community characteristics such as levels of development and levels of contraceptives availability, the restraining influence exerted by social networks and traditional community institutions, and the degree of interpersonal communication concerning HIV/AIDS on condom use in Zambia. The results showed that the consistent and occasional use of condoms decreased with age, marriage, the use of other modern contraceptives and the belief that condom use promotes promiscuity. The use of condoms increased with education, exposure to information about HIV/AIDS, exposure to HIV/AIDS educational programmes, the knowledge that condoms prevent HIV/AIDS transmission, community development, access to condoms and the knowledge that there are no barriers to acquiring condoms.

Zambia is also characterised by the covert use of contraceptives (Biddlecom and Fapohunda 1998; Mahler 1999). Covert use is contraceptive use without the consent of the spouse (Biddlecom and Fapohunda 1998). A study done in Zambia by Mahler (1999) revealed that among the women using contraceptives, 7 per cent used contraception covertly, while 57 per cent of the women interviewed indicated that they would secretly use a contraceptive method even if their husbands disapproved of contraceptive use. The results also revealed that women, who felt that approaching their husbands about contraceptive use would be difficult, were four times more likely to use contraceptives secretly. Women with eight or more years of education were 47 per cent more likely to use a method openly than to use no method, compared with women with less education.

3 DATA ANALYSIS

This chapter describes the data sources used in the study and examines the characteristics of the data with the aim of assessing the quality of the data and explaining the outcomes presented in the next chapter. Section 3.1 looks at the data sources; section 3.2 describes the characteristics of all women interviewed in the 1996, 2001-2 and the 2007 Zambian Demographic and Health Survey; while section 3.3 discusses fertility in the three surveys. Section 3.4 analyses the characteristics of women in the sample compared with women who were not part of the sample; and section 3.5 contains an analysis of the women in our study sample on the basis of their contraceptive use.

3.1 Data sources

This analysis uses the data obtained from the Zambian Demographic Health Surveys (DHS) conducted in 1996, 2001-2 and 2007. DHS data are collected by using individual and household questionnaires. Individual questionnaires collect information on women's reproductive history, fertility preferences, knowledge and use of contraception, and women and their partners' employment status and education, amongst other issues.

The 2001-2 and the 2007 DHS surveys were conducted using a two-stage sampling procedure. Each of the nine provinces in Zambia is subdivided into districts; each district is divided into constituencies, and each constituency into wards. To add to these administrative units, each ward was subdivided into areas called census supervisory areas (CSA) during the 2000 population census, and each CSA into standard enumeration areas (SEA). The SEAs were grouped by CSAs, by CSAs within a ward, by wards within a constituency, by constituencies within a district, and by districts within a province, for the purposes of the ZDHS.

The SEAs were further stratified separately by urban and rural areas within each province. At the second stage of sampling, households in each SEA were randomly selected. The selected households were distributed in 320 clusters in Zambia.

The 1996, 2001-2 and 2007 ZDHS are nationally representative surveys of 8021, 7658 and 7146 women aged 15-49, respectively. The analysis focuses on contraceptive use and fertility intentions; hence, the study sample is restricted to: 7128 women for 1996, 6784 women for 2001-2 and 6214 women for 2007. Women who were excluded in the analysis are women who were pregnant, women who are sterilised, and women who

have never had sex. Since we are looking at the current use of contraceptives, pregnant women, and women who have never had sex are excluded because they are not at risk of getting pregnant and are not currently using contraception. Sterilised women are excluded because they are not at the risk of getting pregnant.

3.2 Background characteristics analysis

From Table 3.1, the age distribution of women in the three DHS surveys shows that there has been a slight decrease in the proportion of women aged 15-19 and 20-24 over the years, while there are almost similar proportions of women aged 35-39, 40-44 and 45-49 over the three surveys. There were more rural respondents interviewed in the three DHS surveys.Table 3.1 clearly shows that the proportion of women with education has increased over time; the 1996 sample shows very few women with higher education than about 2.8 per cent, compared to 5.2 per cent in 2007. The increase in the proportion of women with education over time is consistent with the efforts done by the Zambian government to improve levels of education attained by its people and to increase literacy rate in the country.

There is also an increase in the proportion of women receiving primary and secondary education. Table 3.1 also showed that there has been an improvement in the numbers of women employed over the period, and a decrease in polygynous unions from 16.6 per cent in 1996 to 14.4 in 2007.There has not been any significant change in the proportions of religious and ethnic groups interviewed over the period.

Table 3.1 Background characteristics of women interviewed in the 1996, 2001-2 and 2007 surveys

	1996 ZDHS		2001-2 ZDHS		2007 DHS	
Variable	Weighted %	Weighted N	Weighted %	Weighted N	Weighted %	Weighted N
Age						
15-19	25.0	1982	23.7	1806	22.0	1598
20-24	22.8	1823	21.7	1648	19.2	1405
25-29	16.0	1280	18.0	1361	19.1	1374
30-34	13.5	1083	12.7	972	14.8	1042
35-39	9.5	768	10.0	778	10.5	732
40-44	7.1	569	7.9	606	7.9	533
45-49	6.2	516	6.1	487	6.6	462
Mean age at marriage (years)		17.9		18.0		18.3
Mean age at first birth (years)		18.2		18.2		18.6
Place of residence						
Urban	44.9	3001	40.1	2551	42.1	3178
Rural	55.1	5020	59.9	5107	57.9	3968
Education						
No education	13.3	1168	12.0	1002	10.4	741
Primary	58.9	4833	58.0	4534	54.4	3805
Secondary	25.0	1828	26.9	1916	30.0	2242
Higher	2.8	191	3.1	206	5.2	358
Employment status						
Non-employed	52.0	4047	42.9	3123	45.6	3255
Employed	48.0	3974	57.1	4535	54.5	3891
Marital status						
Never married	25.3	1986	24.8	1851	26.0	1941
Married	74.7	6035	75.2	5807	74.0	5205
Marital union						
Monogamous	83.4	4068	84.6	3918	84.8	3672
Polygynous	16.6	845	15.4	771	14.4	605
Missing	0.0	0	0.0	0	0.9	39
Religion						
Catholic	24.4	1853	23.3	1735	20.4	1368
Protestant	75.4	6029	76.4	5748	77.8	5652
Muslim and other	0.3	18	0.3	17	1.8	126
Ethnicity						
Lozi	6.1	566	6.3	466	5.6	562
Tonga and Ila	12.0	975	12.5	893	11.3	829
Tumbuka,	10.5	745	11.1	777	12.6	795
Bemba and other	71.5	5708	70.0	5522	70.5	4960

	1996 ZDHS		2001-2 ZDHS		2007 DHS	
Variable	Weighted	Weighted N	Weighted %	Weighted N	Weighted %	Weighted N
Desire for more children						
Want within two years	20.2	1682	16.1	1231	11.2	829
Want after two years	31.3	2518	32.0	2471	33.7	2391
Want children but	6.3	530	15.5	1163	14.0	1008
Undecided	3.0	238	3.4	266	8.2	604
Want no more children	22.9	1781	29.8	2233	29.8	2092
Sterilised	1.4	111	1.5	104	1.4	94
Infecund	3.1	265	1.8	162	1.5	116
Missing	11.8	893	0.0	0	0.2	12
Partner's education						
No education	7.5	515	7.5	480	6.9	373
Primary	44.2	2828	45	2741	43.3	2223
Secondary	38.9	2167	38.3	2073	37.6	1991
Higher	7.3	397	7.5	411	9.7	490
Don't know	2.1	112	1.7	94	2.2	109
Missing	0.0	0	0.0	0	0.4	19
Partner employment						
Non-agricultural	56.4	3101	51.7	2701	54.7	2951
Agricultural occupation	43.5	2907	48.3	3061	45.3	2254
Missing	0.1	3	0.0	0	0.0	0

3.3 Fertility

Fertility estimates for women interviewed can be calculated by using the birth history data in the DHS; since these estimates are expected to be representative of all the women in the country. The data are shown in Table 3.2Table 3.2 and Figure 3.1.

Table 3.2 ASFR and TFR in the three years before the survey by year of survey for women aged 15-49

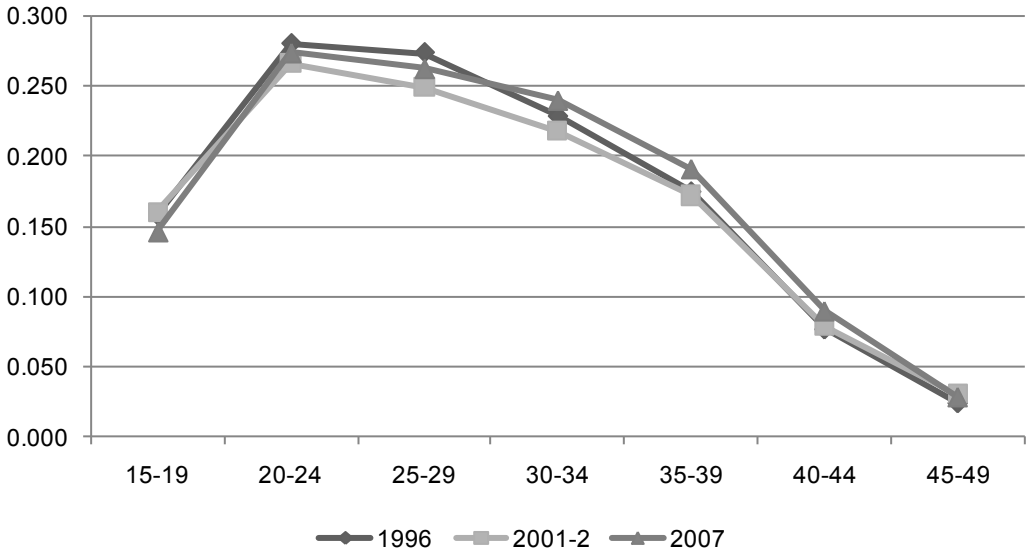
	Survey		
	1996	2001-2	2007
ASFR			
15-19	0.158	0.160	0.146
20-24	0.280	0.266	0.274
25-29	0.274	0.249	0.263
30-34	0.229	0.218	0.240
35-39	0.175	0.172	0.191
40-44	0.077	0.079	0.090
45-49	0.024	0.030	0.029
TFR	6.1	5.9	6.2

Source: Derived from ZDHS 1996, 2001-2 and 2007

In general, the age patterns of fertility for all the three surveys are very similar. Fertility is concentrated in the 20-24 age group for all the surveys. There was a slow decline in fertility between 1996 and 2001-2; while for the period 2001-2 to 2007, an increase in fertility was observed. An increase in fertility here is some cause for concern, such that some further analysis should be done to see if this was a genuine increase in fertility or if

this increase could have been the result of data errors. To further investigate this, fertility is going to be analysed separately for urban and rural areas, as shown in Table 3.3.

Figure 3.1 ASFRs in the three years before the survey, by survey and age of women at the survey



Source: Derived from ZDHS 1996, 2001-2 and 2007

Table 3.3 shows that there are very large urban-rural differentials in ASFR for all age groups, the largest variations being in the age groups 20-24 and 25-29.
Table 3.3 shows an increase in rural fertility between 2001-2 and 2007; the rural TFR increased by 0.6 of a child in a space of only five years; this is unlikely, and this increase might be attributed to defective 2001-2 data. Urban fertility, on the other hand, remained constant between 2001-2 and 2007.

Increase in rural fertility between 2001-2 and 2007 must be the reason why there was also a sharp increase in the national fertility rates during the same period. The data might be defective in the sense that there were some omissions of current births in the 2001-2 survey, assuming that births were unlikely to be over-reported in 2007. If some current births had been omitted in the 2001-2 survey, this would lead to an underestimate of fertility in 2001-2.

Table 3.3 ASFRs and TFR by place of residence and year of survey

	1996		2001-2		2007	
	Urban	Rural	Urban	Rural	Urban	Rural
ASFR						
15-19	0.127	0.184	0.127	0.185	0.099	0.189
20-24	0.236	0.318	0.192	0.320	0.201	0.329
25-29	0.248	0.297	0.197	0.288	0.190	0.314
30-34	0.211	0.243	0.159	0.254	0.181	0.277
35-39	0.137	0.203	0.113	0.204	0.127	0.228
40-44	0.050	0.097	0.043	0.101	0.052	0.114
45-49	0.008	0.032	0.025	0.033	0.005	0.044
TFR	5.1	6.9	4.3	6.9	4.3	7.5

Source: Derived from ZDHS 1996, 2001-2 and 2007

3.4 Background characteristics of respondents in the sample and outside the sample.

This section looks at characteristics of women who are in the study sample (who have ever had sex) and women who are not in the sample (who have never had sex). Table 3.4 displays the background characteristics of women in the sample and those not in the sample.

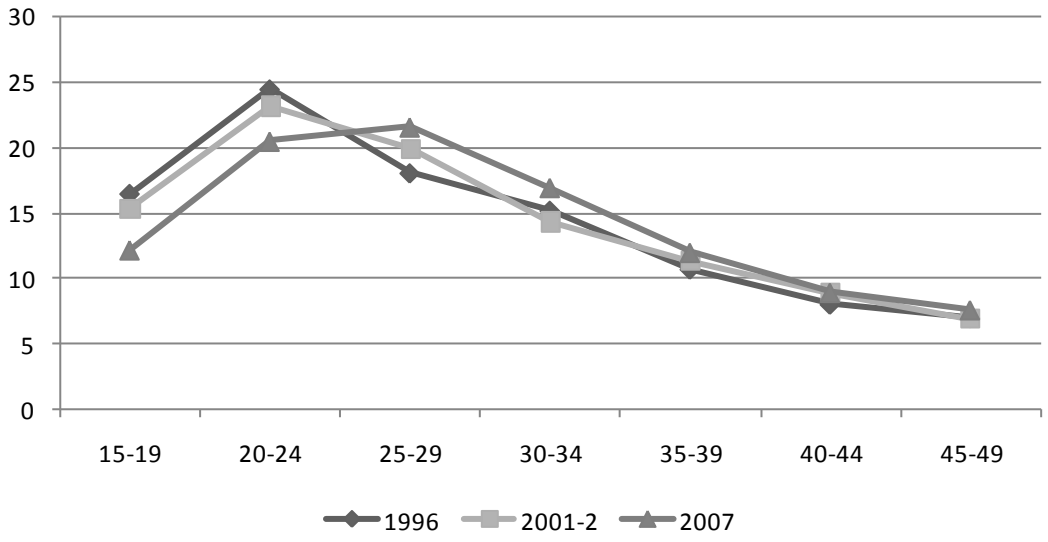
Figure 3.2 shows the distribution of women who had ever had sex by age. Our sample of women who had ever had sex consists of more women who are aged 20-24 compared to other age groups. The age distribution of women in the sample is consistent for the years 1996 and 2001-2002 while in the 2007 distribution there are more women aged 25-29 compared to other age groups. There has been a slight decrease in the proportion of women aged 15-19 and 20-24 over the years, while there are almost similar proportions of women aged 35-39, 40-44 and 45-49 over the three surveys. There has been a decrease in the interviewed women aged 20-24 who are sexually active, resulting in an increase in women aged 25-29 sexually active over the period, which might mean that women are delaying sexual activity in Zambia.

Table 3.4 Background characteristics of women who have ever had sex and who have never had sex by year of survey

	1996				2001-2				2007			
	Ever had sex		Never had sex		Ever had sex		Never had sex		Never had sex		Ever had sex	
Variable	Weighted %	N	Weighted %	N	Weighted %	N	Weighted %	N	Weighted %	N	Weighted %	N
AGE												
15-19	16.5	1183	88.5	799	15.4	1048	85.3	758	12.2	796	85.9	802
20-24	24.5	1740	10.1	83	23.2	1563	10.7	85	20.5	1309	10.3	96
25-29	18.1	1274	0.7	6	19.9	1337	3.3	24	21.6	1352	2.5	22
30-34	15.2	1079	0.5	4	14.3	966	0.6	6	17.0	1038	0.4	4
35-39	10.7	767	0.1	1	11.3	777	0.1	1	12.0	729	0.2	3
40-44	8.0	569	0.0	0	8.9	606	0.0	0	9.0	529	0.6	4
45-49	7.0	516	0.0	0	6.9	487	0.0	0	7.6	461	0.2	1
Mean age at marriage (years)		18.0		-		18.0		-		18.3		-
Mean age at first birth (years)		18.0		-		18.2		-		18.6		-
Place of residence												
Urban	43.4	2561	56.5	440	38.8	2178	49.8	373	39.5	2617	59.1	561
Rural	56.6	4567	43.5	453	61.2	4606	50.2	501	60.5	3597	41.0	371
Education												
No education	14.3	1115	5.6	53	13.0	950	5.5	52	11.6	715	2.4	26
Primary	59.5	4330	53.8	503	59.1	4075	49.5	459	56.6	3440	40.4	365
Secondary	23.1	1501	39.3	327	24.9	1574	42.1	342	26.3	1732	53.7	510
Higher	3.0	181	1.4	10	3.1	185	2.9	21	5.5	327	3.5	31
Employment status												
Non-employed	48.2	3341	80.2	706	38.9	2502	73.1	621	40.2	2510	80.7	745
Employed	51.8	3787	19.7	187	61.1	4282	26.9	253	59.9	3704	19.3	187
Marital status												
Never married	15.4	1093	100.0	893	14.7	977	100.0	874	14.6	1009	1.0	932
Married	84.6	6035	-	-	85.3	5807	-	-	85.4	5205	-	-
Marital union												
Monogamous	83.4	4068	-	-	84.6	3918	-	-	84.8	3672	-	-
Polygynous	16.6	845	-	-	15.4	771	-	-	14.4	605	-	-
Missing	0.0	0	-	-	0.0	0	-	-	0.9	39	-	-

	1996				2001-2				2007			
	Ever had sex		Never had sex		Ever had sex		Never had sex		Never had sex		Ever had sex	
Variable	Weighted %	N	Weighted %	N	Weighted %	N	Weighted %	N	Weighted %	N	Weighted %	N
Religion												
Catholic	23.7	1619	26.9	234	23.1	1518	25.1	217	20.1	1173	22.4	195
Protestant	74.8	5375	72.9	654	76.7	5104	74.6	644	78.1	4930	75.8	722
Muslim and other	1.5	18	0.2	3	0.3	15	0.3	2	1.8	111	1.9	15
Ethnicity												
Lozi	6.1	509	0.0	57	6.5	424	5.2	42	5.9	513	3.4	49
Tonga and Ila	11.9	863	12.2	112	12.6	792	12.2	101	11.3	719	11.5	110
Tumbuka,	10.4	653	11.4	92	11.0	682	12.0	95	12.6	685	12.7	110
Bemba and other	71.6	5077	70.6	631	69.9	4885	70.7	636	70.2	4297	72.4	663
Missing	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0
Desire for more												
Want within two	22.9	1682	-	-	17.9	1209	2.4	22	12.8	817	0.9	12
Want after two	35.5	2518	-	-	33.0	2269	24.5	202	34.2	2124	30.5	267
Want children but	7.2	530	-	-	10.0	668	56.2	495	8.4	543	50.6	465
Undecided	3.4	238	-	-	2.8	194	8.1	72	7.4	460	13.2	144
Want no more	26.0	1781	-	-	32.8	2174	7.2	59	33.9	2068	3.0	24
Sterilised	1.6	111	-	-	1.7	104	0.0	0	1.6	94	0.0	0
Infecund	3.5	265	-	-	1.9	142	1.7	20	1.5	97	1.6	19
Missing	0.0	0	-	-	0.0	0	1.4	0	0.2	11	0.2	1
Partner's												
No education	7.5	515	-	-	7.5	480	-	-	6.9	373	-	-
Primary	44.2	2828	-	-	45.0	2741	-	-	43.3	2223	-	-
Secondary	38.9	2167	-	-	38.3	2073	-	-	37.6	1991	-	-
Higher	7.3	397	-	-	7.5	411	-	-	9.7	490	-	-
Don't know	2.1	112	-	-	1.7	94	-	-	2.2	109	-	-
Missing	0.0	0	-	-	0.0	0	-	-	0.4	19	-	-
Partner												
Non-agricultural	56.4	3101	-	-	51.7	2701	-	-	54.7	2951	-	-
Agricultural	0.0	2907	-	-	48.3	3061	-	-	45.3	2254	-	-
Missing	0.0	3	-	-	0.0	0	-	-	0.0	0	-	-

Figure 3.2 Age distribution of women who are sexually active by year of survey.



The sample to be used in the analysis (ever been sexually active) consists more of rural respondents than urban respondents for all surveys, as shown in Table 3.4.

Education is associated with late engagement in sexual activity for younger women. Table 3.5 showsTable 3.5 that the categories no education and primary education have more women who have ever had sex compared to women who have never had sex at younger ages 15-19. As educational attainment improves to secondary school level there are more women who have never had sex compared to ever have sex at this age group 15-19. Having more women with higher education who have ever had sex for older women compared to women who have never had sex is consistent with what is to be expected, since women with higher education are older; and therefore, the chances of having engaged in sexual activity are higher.

Table 3.5 Per cent distribution of women interviewed in the three surveys by age, sexual activity and education

	1996							
			Primary		Secondary		Higher	
	Ever had	Never had	Ever had	Never had	Ever had	Never had	Ever had	Never had
15-19	10.1	6.0	64.0	58.3	25.8	35.8	0.1	0.0
20-24	11.3	2.8	59.4	19.7	27.8	67.9	1.5	9.6
25-29	11.8	0.0	57.3	13.5	26.8	67.3	4.1	19.2
30-34	13.1	0.0	60.8	22.9	21.2	22.9	4.8	54.1
35-39	14.2	0.0	62.9	0.0	17.7	100.0	5.2	0.0
40-44	20.6	0.0	53.5	0.0	19.1	0.0	6.8	0.0
45-49	37.3	0.0	54.3	0.0	7.8	0.0	0.6	0.0

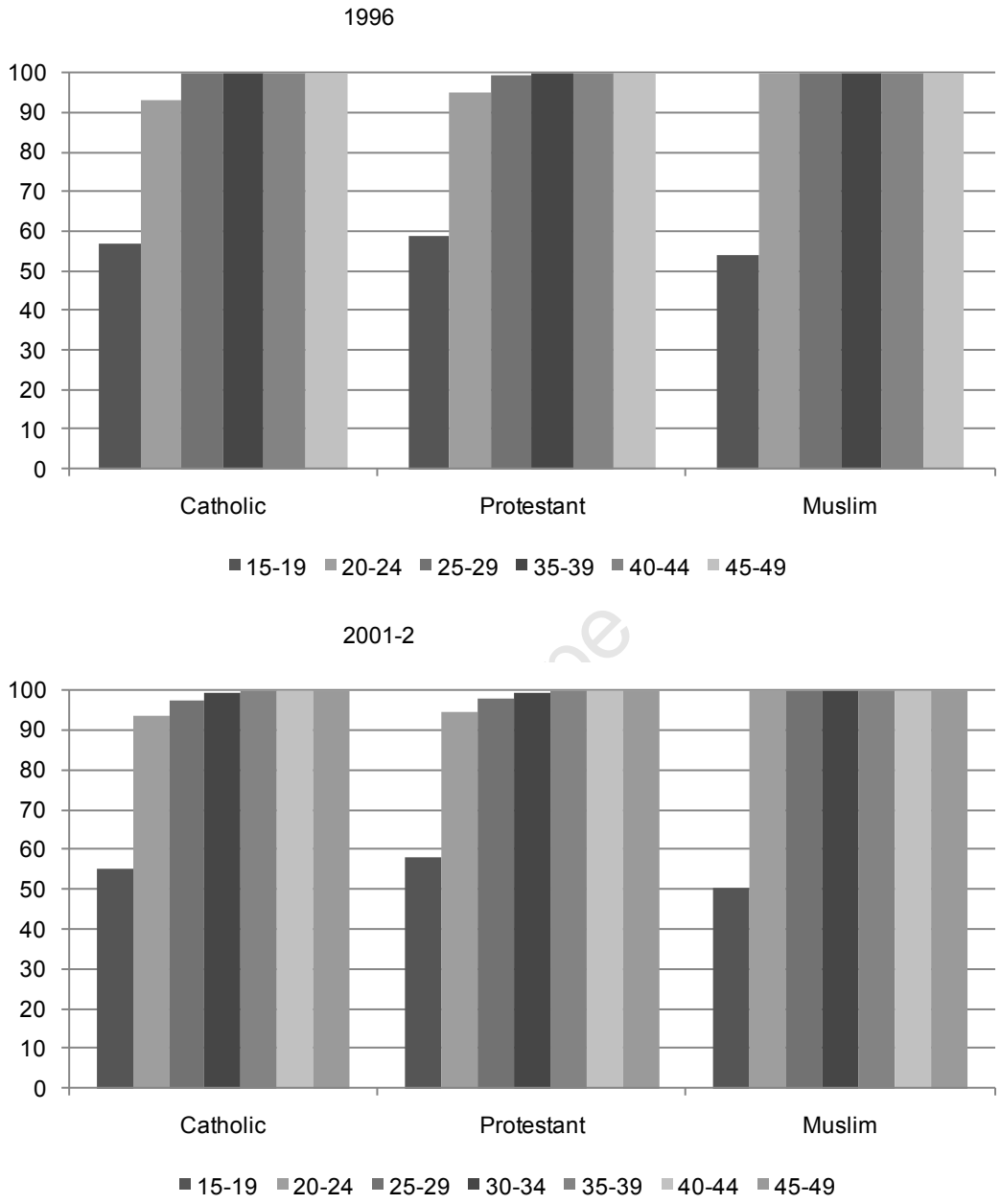
2001-2								
	No education		Primary		Secondary		Higher	
	Ever had	Never had	Ever had	Never had	Ever had	Never had	Ever had	Never had
15-19	10.0	5.4	61.3	53.8	28.7	40.7	0.0	0.1
20-24	11.9	6.2	55.1	25.0	30.5	55.9	2.5	13.0
25-29	10.7	0.0	57.3	23.7	27.2	36.7	4.8	39.6
30-34	11.3	21.7	59.6	28.3	25.0	32.3	4.2	17.8
35-39	15.8	100.0	61.6	0.0	19.9	0.0	2.6	0.0
40-44	17.6	0.0	62.9	0.0	15.6	0.0	3.9	0.0
45-49	22.6	0.0	62.5	0.0	10.9	0.0	4.1	0.0

2007								
	No education		Primary		Secondary		Higher	
	Ever had	Never had	Ever had	Never had	Ever had	Never had	Ever had	Never had
15-19	6.0	2.2	53.0	44.5	40.9	52.6	0.2	0.7
20-24	9.9	3.6	52.4	13.0	33.2	69.0	4.5	14.4
25-29	9.7	0.0	54.6	24.3	27.9	32.0	7.8	43.7
30-34	13.0	0.0	59.9	0.0	22.3	41.2	4.9	58.8
35-39	12.7	14.4	63.2	66.1	16.6	19.6	7.5	0.0
40-44	17.2	28.6	59.1	0.0	17.6	60.8	6.1	10.6
45-49	19.6	0.0	58.9	100.0	14.3	0.0	7.3	0.0

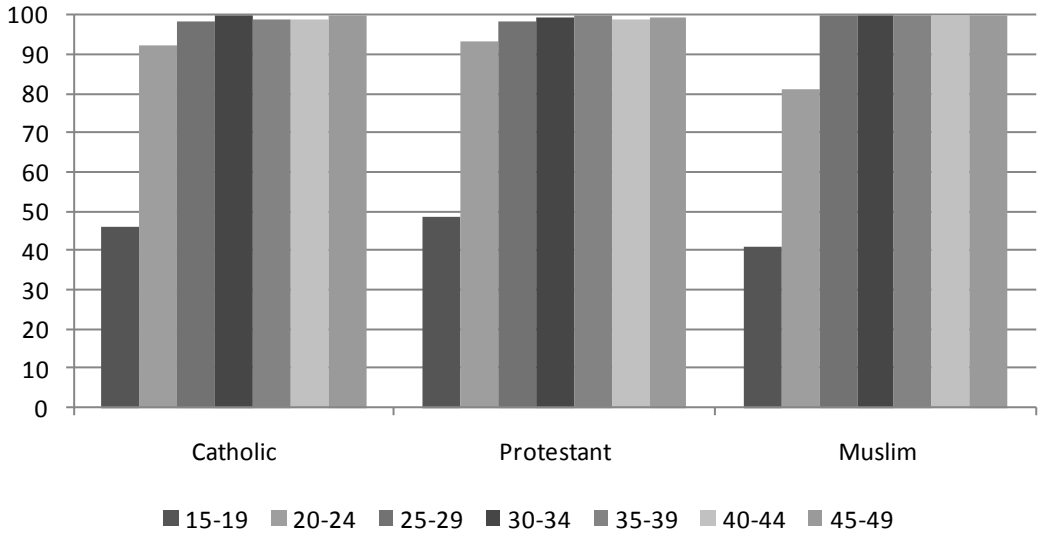
From Table 3.4, a larger proportion of unemployed women have never had sex; this is to be expected, since as these women are most likely to be young (aged 15-19), and most of them are not working while some are still in school.

Figure 3.3 shows the distribution of women who have ever had sex by age and religion. Comparing age groups across the three religions, it is clear that Muslims delay engaging in sex. The proportion of sexually active Muslim women aged 15-19 is smaller compared to the other two religions, confirming that Muslims delay engaging in sexual activity.

Figure 3.3 Per cent distribution of women who were interviewed in the three surveys, who have ever had sex by age and religion



2007



3.5 Background characteristics of women by contraceptive use

This section looks at characteristics of women by contraceptive use. These characteristics are summarised in Table 3.6. The table looks at the characteristics of women who have been using contraceptive use over time in Zambia.

3.5.1 Age

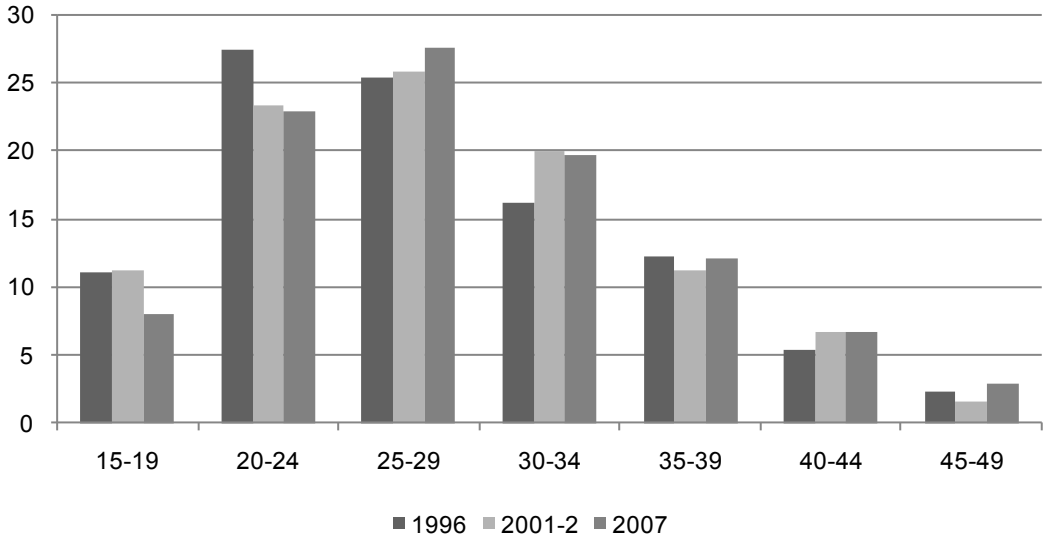
Figure 3.4 shows per cent distribution of women who use contraception by age and year of survey. There is a curvilinear relationship between age and contraceptive use, with contraceptive use being lower at younger and older ages. Middle-aged women are more likely to use contraception than younger and older women. Proportions of women using contraception have been increasing over the period. On the other hand, the biggest proportion of contraceptive users is in the 20-24 age group for the 1996 survey, and 25-29 for the 2001-2 and 2007surveys. Table 3.6 shows that there has been an increase in the use of contraceptives in all age groups over time.

Table 3.6 Background characteristics of women interviewed in the three surveys by contraceptive use

	Contraceptive Use					
	1996		2001-2		2007	
Variable	Weighted %	N	Weighted %	N	Weighted %	N
AGE						
15-19	10.3	91	10.4	135	7.6	155
20-24	25.1	207	21.6	293	21.8	394
25-29	22.2	178	24.3	313	26.4	482
30-34	15.2	128	19.3	246	19.0	333
35-39	12.8	105	12.4	172	12.6	215
40-44	10.0	80	9.1	123	8.0	136
45-49	4.4	40	2.9	40	4.8	79
Mean age at marriage (years)		18.6		18.3		18.4
Mean age at first birth (years)		18.6		18.4		18.7
Place of residence						
Urban	68.1	501	58.1	679	46.5	893
Rural	31.9	328	42.0	643	53.5	901
Education						
No education	5.2	50	5.6	81	9.8	166
Primary	47.6	410	51.6	686	52.9	908
Secondary	36.8	290	36.3	473	30.0	595
Higher	10.5	79	6.5	82	7.4	125
Employment status						
Non-employed	45.2	364	41.0	521	39.6	701
Employed	54.8	465	59.0	801	60.4	1093
Marital status						
Never married	12.8	108	9.5	128	9.2	207
Married	87.2	721	90.5	1194	90.8	1587
Marital union						
Monogamous	91.4	585	91.2	967	88.0	1265
Polygynous	8.6	60	8.9	107	11.0	149
Missing	0.0	1	0.0	0	1.0	15
Religion						
Catholic	27.1	219	21.6	282	19.6	339
Protestant	72.8	600	78.1	1027	78.9	1431
Muslim and other	0.2	1	0.3	3	1.5	24
Ethnicity						
Lozi	7.5	72	6.3	85	6.2	170
Tonga and Ila	11.3	92	13.6	175	12.3	230
Tumbuka, Mambwe Ngoni	12.8	99	11.6	148	15.5	250
Bemba and other groups	68.4	563	68.5	914	66.1	1144
Missing	0.0	0	0.0	0	0.0	0

Contraceptive Use						
	1996		2001-2		2007	
Variable	Weighted %	N	Weighted %	N	Weighted %	N
Desire for more children						
Want within two years	13.5	115	10.1	133	8.6	163
Want after two years	39.5	322	37.5	498	40.7	732
Want children but undecided about t	5.3	47	6.8	86	5.3	108
Undecided	2.6	21	1.4	20	7	123
Want no more children	26.3	210	36.1	471	32.4	566
Sterilised	12.7	111	7.8	104	5.7	94
Infecund	0.2	2	0.4	7	0.2	5
Missing	0.0	1	0.0	0	0.3	3
Partner's education						
No education	3.3	30	3.1	44	4.7	74
Primary	28.2	218	31.4	395	38.0	588
Secondary	47.5	328	49.6	562	41.0	670
Higher	20.1	137	15.1	182	14.5	227
Don't know	0.8	5	0.8	8	1.4	22
Missing	0.0	1	0.0	0	0.4	6
Partner employment						
Non-agricultural	77.6	523	72.0	808	61.8	1022
Agricultural occupation	22.4	193	28.0	377	38.2	565
Missing	0.0	0	0.0	0	0.0	0
Total	100	100	100	100	100	100

Figure 3.4 Age distribution of women who use contraception in the sample by year of survey



3.5.2 Education

Table 3.7 below shows that there is an increase in contraceptive use with an increase in the level of education. Women with higher education have the bigger proportion of contraceptive users compared to those in other educational levels.

Married women and women living with their partners use more contraception, compared to never married, divorced, widowed and women who do not live with their partners. The lowest users of contraception are women who have never been married, as shown in Table 3.7.The percent distribution of ever married women by age and year of survey in Table 3.11 below shows that among the older women, marriage is universal. The universality of marriage means the use of contraception is low since most of child bearing is confined within marriage. The majority of women aged 45-49 have ever been married across all surveys. A significant proportion of young women aged 15-19 in all the three surveys are married. This indicates early marriage in Zambia. The occurrence of marriage early in life means that child bearing starts early in life and continued until late in the reproductive span, therefore contraception in this case will be most for spacing.

Table 3.7 Per cent distribution of women using contraception by selected variables and year of survey

	1996	2001	2007
Education			
No education	4.6	9.3	23.7
Primary	10.2	18.7	26.5
Secondary	20.3	31.2	32.4
Higher	44.2	45.5	38.2
Marital status			
Never married	10.6	13.9	17.9
Married	14.4	25.5	32.7
Living together	14.5	15.3	26.8
Widowed	6.4	9.6	14.9
Divorced	7.9	10.5	18.5
Not living together	7.4	15.2	20.1
Number of wives			
No other	15.8	27.4	33.9
1	9.2	14.3	25.0
2	2.8	16.6	25.0
3	2.3	9.1	26.8
Don't know	0.0	0.0	31.8
Religion			
Catholic	14.4	20.3	27.6
Protestant	12.3	22.0	28.6
Muslim and others	6.1	21.2	24.2
Ethnicity			
Lozi	15.7	20.7	29.9
Tonga	12.0	23.2	30.8
Tumbuka	15.8	22.6	34.7
Bemba	12.1	20.9	26.7
Desire for more children			
Want within two years	7.5	12.0	19.0
Want after two years	14.1	24.3	33.7
Want children, undecided about timing	9.3	14.5	17.8
Undecided	9.5	10.7	26.7
Want no more children	12.9	23.6	27.1
Infecund	0.8	4.4.0	3.1
Missing	0.0	0.0	32.6
Husband/partner's education			
No education	5.8	9.4	20.5
Primary	8.4	15.8	26.4
Secondary	16.0	29.4	32.9
Higher	36.3	45.5	45.1
Don't know	5.1	10.9	19.1
Missing	0.0	0.0	35.3
Husband/Partner's employment			
Not working	12.2	21.2	27.1
Professional and technical	17.0	30.5	31.3
Agriculture	5.9	13.4	21.9
Manual work	14.8	30.6	28.9

Table 3.7 shows that women in monogamous relationships are more likely to use contraception compared to women in polygynous relationships. There is no significant difference in the use of contraception when looking at the number of wives a man has, for those in polygynous relationships. Women with partners who have one other wife and those with partners who have two other wives have almost the same proportions of contraceptive users. Our results show that the number of wives does not determine the use of contraception, but being in monogamous or polygynous relationships does.

Table 3.7 shows that the proportions of contraceptive users for the Catholic group and Protestant group are almost the same for all the three surveys, and the proportion for Muslim and other religions contraceptive users is not very different from the other two main groups. This is an indication that there might not be a statistically significant relationship between contraceptive use and religion. A bivariate analysis was done to test this and we found that there is no statistical significant relationship between contraceptive use and religion.

The Tumbuka ethnic group has more women using contraception compared to other ethnic groups in the 1996 and 2007 surveys; on the other hand, there are more Tonga users among women interviewed in 2001-2, as shown in Table 3.8.

Further analysis looking at the distribution of women who use contraception by age and ethnicity for the 2007 survey in Table 3.8 reveals that the Tonga, Tumbuka and Lozi have more contraceptive users who are aged 15-19. On the other hand, the Bemba ethnic group has more users who are aged 15-19. Table 3.8 also shows that there is an increase in the use of contraception among all ethnic groups over time.

Table 3.8 Percent distribution of women using contraception interviewed in the 2007 survey by age and ethnicity

	Lozi	Tonga	Tumbuka	Bemba
15-19	10.3	15.1	14.4	64.1
20-24	7.1	9.0	11.3	73.4
25-29	6.6	12.8	11.3	70.0
30-34	4.8	8.6	9.2	76.7
35-39	4.5	10.5	10.2	73.0
40-44	4.2	9.7	11.2	75.2
45-49	7.5	10.4	14.0	71.1

Table 3.7 shows that women who want no more children are less likely to use contraception compared to women who want children after two years. The table also shows that women with husbands/partners with higher education use more contraception; and the use of contraception increases with an increase in education, as

can be expected. From Table 3.7, women with partners employed in professional and technical services use more contraception compared to women with partners employed in other occupations; and women with partners employed in agricultural services use less contraception.

3.5.3 Place of residence and current use of contraception

There are more urban contraceptive users compared with rural users for all the survey years, as reflected in Table 3.9 below.

Table 3.9 Per cent distribution of women using contraception by age and place of residence

	1996		2001-2		2007	
	Urban	Rural	Urban	Rural	Urban	Rural
15-19	1.8	0.9	3.4	1.5	2.2	2.1
20-24	4.8	2.0	6.2	3.6	7.0	5.6
25-29	4.8	1.3	8.6	3.0	9.2	6.3
30-34	3.1	1.1	6.7	2.5	6.1	4.9
35-39	2.7	0.8	3.2	2.3	3.9	3.4
40-44	2.1	0.6	3.0	1.3	3.1	1.7
45-49	0.7	0.5	0.9	0.5	1.9	1.0

3.5.4 Employment status and current use of contraception

Table 3.10 displays women who use contraception distributed by age and occupation type. Looking at women who are employed only, the table shows that a larger proportion of contraceptive users are employed in professional and technical types of occupation, while women who are manual workers use less contraception.

Table 3.10 Per cent distribution of women who use contraception by age and occupation

	Not work	Professional	Agriculture	Manual workers	Total
15-19	61.4	16.3	19.2	3.1	100
20-24	47.3	24.6	26.1	1.9	100
25-29	43.5	33.1	19.2	4.3	100
30-34	33.9	32.3	28.5	5.4	100
35-39	32.1	37.4	24.7	5.8	100
40-44	23.4	41.2	25.1	10.3	100
45-49	17.8	48.6	25.0	8.6	100

Table 3.11 Percent distribution of ever married women by age and year of survey

	1996	2001-2	2007
15-19	46.8	47.1	40.5
20-24	82.3	80.1	79.3
25-29	91.0	94.0	90.3
30-34	97.7	96.2	95.8
35-39	98.8	99.3	98.5
40-44	98.8	99.2	99.5
45-49	99.3	99.8	99.6

3.5.5 Method of current contraception

Table 3.12 displays the per cent distribution of women by selected variables and method of contraception currently being used. Analysing selected independent variables (age, education and marital status) in relation to the preference of modern contraception, the use of the pill is more common to middle-aged women (25-39) compared to other age groups. Married women and divorced women also prefer using the pill. The distribution of the use of the injection as a method of contraception is almost equal among all age groups for the year 2007, with fewer women with higher education and women never married using this method.

Male condoms are one of the most used methods, with more users amongst those aged 15-19, never married women and women with higher education. Lactational amenorrhea is most popular among women with no education, married women and middle-aged women who are still giving birth.

Table 3.12 Selected variables and preferences for modern contraceptive methods

	Contraceptive method								
	Pill			Injection			Male		
	1996	2001-2	2007	1996	2001-2	2007	1996	2001-2	2007
Age									
15-19	21.5	34.2	18.3	1.4	10.9	22.2	74.3	48.5	45.5
20-24	51.2	48.4	29.6	5.4	12.9	29.6	40.8	27.7	24.7
25-29	59.0	48.4	36.2	7.5	18.3	26.9	29.9	21.2	17.3
30-34	59.0	47.9	35.7	8.3	20.5	25.3	19.3	17.7	17.7
35-39	44.8	44.2	30.6	8.8	20.0	20.5	21.1	9.2	17.4
40-44	21.0	30.7	23.0	10.5	19.6	25.5	7.1	9.8	18.1
45-49	18.2	27.0	17.7	0.0	15.3	18.4	2.6	5.8	10.0
Education									
No education	51.0	26.1	20.0	0.0	19.5	17.8	19.4	22.9	11.7
Primary	44.0	44.0	29.1	6.4	16.3	28.4	30.9	19.9	17.4
Secondary	48.6	47.2	36.3	6.5	18.8	25.8	32.7	22.3	26.6
Higher	42.0	42.7	33.9	11.3	10.6	13.9	33.6	34.5	35.7
Marital status									
Never married	24.0	23.7	11.9	2.3	6.7	13.3	73.7	65.9	66.3
Married	49.7	47.9	34.4	7.2	18.0	26.1	24.0	15.1	14.2
Living together	54.9	34.6	4.9	0.0	24.6	44.6	37.5	29.4	50.5
Widowed	31.3	26.1	14.0	7.3	19.5	31.3	21.9	27.6	33.3
Divorced	50.7	26.5	23.2	5.4	18.2	29.0	29.4	48.4	33.5
Not living	25.0	40.6	16.4	14.6	18.9	38.1	54.9	32.7	23.9

4 LOGISTIC REGRESSION

Section 3.5 looked at the relationship between various factors and contraceptive use to see how these variables affect the use of contraception by women. However, this is not enough to examine the factors that influence women's choices and use of contraception in Zambia, since the techniques used in Chapter 3 did not control for the relationship among the variables, hence the need for this chapter to employ a multivariate approach. Multivariate regression will take into account several factors simultaneously, thus modelling use of contraceptives more accurately, it will allow us to control for many other factors that simultaneously affect contraceptive use. Multivariate regression will accommodate our explanatory variables that may be correlated.

4.1 Logistic regression model

The relationship between current use of contraceptives and its determinants will be modelled using the logistic regression model. Logistic regression is a predictive model that is used to analyse the data, when the response variable or the dependent variable are binary (Agresti 2002). Logistic regression is normally used in situations where there is a need to predict whether something is likely to happen or not: "yes" or "no" situations. Logistic regression modelling has the advantage that independent variables do not need to have equal variance in each group; and they do not have to be normally distributed.

In other words logistic regression model do not engage strict assumptions regarding normality, linearity and homoscedasticity. The error terms (residuals) do not need to be normally distributed. The logistic regression applies a non-linear log transformation of the predicted odds ratio therefore; the relationship between the response and the independent variable does not need to be linear. In a multivariate logistic model, an impact of a single independent variable on the response or the dependent variable can be tested while controlling for all other independent variables in the model.

The logistic regression model is of the form:

$$\left[\text{logit}\,(p_i) = \log\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_K X_K\right] \qquad (1)$$

where p_i is probability of current use of modern contraception for an individual i, and the Xis are determinants of contraception or independent variables.

$\frac{p_i}{(1-p_i)} = e^{\alpha+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\ldots\beta_k X_k}$ is equal to the odds ratio (OR) of a woman currently using modern contraception relative to a woman not currently using modern contraception.

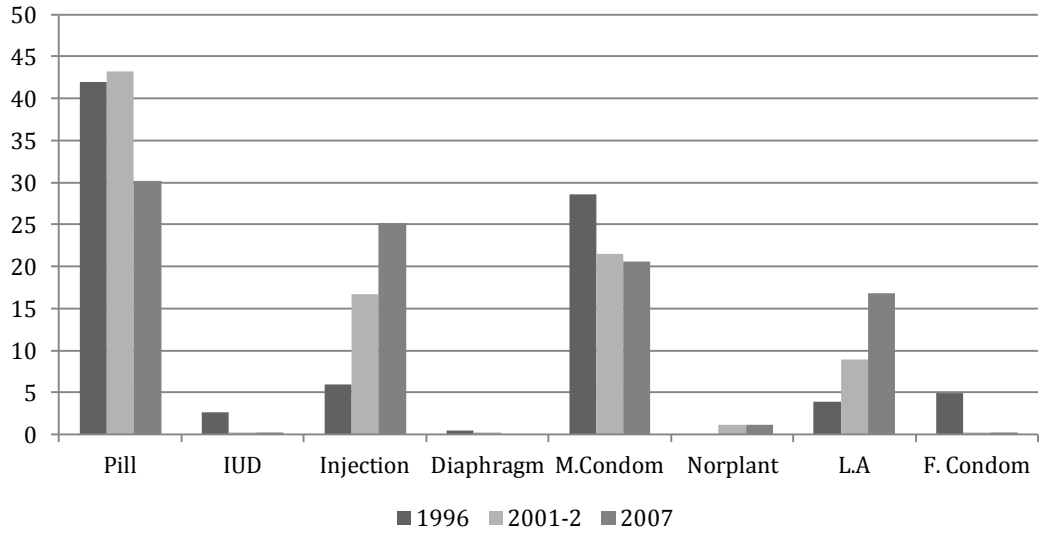
The results of the logistic models will be presented as the odds, since this is the most easily understood. Odds ratios greater than one indicate that women in that respective category have a higher chance of using modern contraception, while odds ratios less than one means women have fewer chances of using modern contraception relative to the reference category. Coefficients of independent variables will be examined to see whether a change in the independent variable would bring about a change in the independent variable such that the inclusion of that independent variable makes the model better. Thus, the statistical significance of the contribution of an independent variable needs to be evaluated. The p-value will be used to test the significance of the coefficients in the model, where a p-value less than 0.05 signifies that the variable is statistically significant at the 5 per cent level.

4.2 Variables

The dependent variable is a dichotomous response variable that is assigned a value 1 when a woman is currently using a modern contraceptive method (the pill, intrauterine device (IUD), injectables, implants, male condom, female condom, diaphragm, foam/jelly) and zero otherwise. The contraceptive method of sterilisation is not going to be included in the definition of our modern current contraceptive methods, because sterilised women are not at any risk of getting pregnant; therefore, they are not part of our sample.

Current modern use of contraception is chosen instead of the current use of any method, because few women use traditional contraception in Zambia, and also because of the relative ineffectiveness of traditional methods.

Figure 4.1 Per cent distribution of women by contraceptive method currently used



Note: M. Condom refers to male condom, L.A to lactational amenorrhoea and F. Condom to female condom

The most common method of contraception is the pill, as shown in Figure 4.1, followed by the male condom. The graph also shows that there has been a big change towards the use of injectables, from 6 per cent in 1996 to 25 per cent in 2007.

Independent variables that are going to be included in the model have been chosen, according to their association with contraceptive use from previous studies, as outlined in Chapter 2, and the availability of the variable in the data set. Independent variables in the model are: age, place of residence, employment status, marital status, ethnicity, desire for more children, respondent's education, partner/husband's education and partner/husband's employment.

4.3 Results of the logistic regression

Stata was used to investigate the relationship between contraceptive use and the variables described in using maximum-likelihood estimation methods. The p-value was used to test the significance of the coefficients in the model, where a p-value less than 0.05 signifies that the variable is statistically significant at the 5 per cent level.

Independent variables as well as the dependent variable were standardised, in order to be used in all the three surveys for comparative purposes. Since some of the variables are closely interrelated, interaction terms were introduced in the model, in order to assess the relative importance of each variable and the combined relevance in

determining contraceptive use. An interaction term of education and age was also included in the model.

Table 4.1 below displays multivariate logistic regression odds ratios for statistically significant variables in the model. Age, place of residence, marital status, number of living children and respondent's education are statistically significant with p-values less than 0.05. On the other hand, the desire for more children is significant for the category of women who want children after 2 years. In 2001-2 and 2007, women who want to have children after 2 years were 1.8 times more likely to use contraception than women who want children within two years. Age and age squared are significantly related to contraceptive use. Coefficients for age and age squared imply a non-linear relationship, in which contraceptive use rises initially, but then falls as age increases. In all the three surveys, women with higher education were more likely to use contraception than women without education; and the odds of using contraception increase with increasing educational attainment.

From the table, the overall picture is that the use of contraception by women who live in urban areas is higher compared to other categories. In 1996, the odds of using contraception for women who live in rural areas are almost 44 per cent less than of women who live in urban areas; in 2001-2, the odds narrowed down such that the odds of using contraception for rural women were 34 per cent less than for urban women; by 2007, the odds of using contraception by rural women were 12 per cent less than those of urban women.

This trend shows us that the gap between the use of contraception by urban women and rural women has been narrowing over time. This clearly shows that there has been a tremendous increase in the use of contraception by rural women. There is no strong and significant relationship between contraceptive use and women employed as manual workers in all three of the surveys. The odds of using contraception by women who are employed as professional or technical workers are 30 per cent more than the odds of women who are not working. An increase in one unit in the number of living children results in the odds of using contraception being increased 1.2 times; and the results in the three surveys are almost consistent. The interaction of respondent education and age was found to be statistically insignificant in the model; therefore, it was dropped from the model.

Table 4.1 Odds ratios of logistic regression for contraceptive use by selected women's characteristics and year of survey

	1996 (6782 women)		2001-2 (6603 women)		2007 (6106 women)	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Age	1.187	0.001	1.252	0.000	1.194	0.000
Age-squared	0.996	0.000	0.995	0.000	0.996	0.000
Residence						
Urban (ref)						
Rural	0.564	0.000	0.663	0.000	0.812	0.023
Employment status						
Not working (ref)						
Professional and technical	0.942	0.588	1.321	0.013	1.263	0.017
Agriculture	0.652	0.006	0.766	0.010	0.846	0.066
Manual workers	1.299	0.108	1.352	0.107	1.170	0.316
Marital status						
Never married (ref)						
Married monogamously	0.760	0.615	1.084	0.857	1.362	0.266
Married polygynously	0.412	0.110	0.483	0.101	0.844	0.557
Number of living children	1.280	0.000	1.297	0.000	1.258	0.000
Ethnicity						
Bemba (ref)						
Lozi	1.289	0.107	1.153	0.364	1.457	0.003
Tonga	1.282	0.122	1.250	0.079	1.337	0.003
Tumbuka	1.211	0.238	0.921	0.54	1.587	0.000
Desire for more children						
Want within 2 years (ref)						
Want after 2 years	1.584	0.001	1.876	0.000	1.911	0.000
Want but unsure about	1.440	0.066	1.753	0.001	1.246	0.207
Undecided	1.064	0.813	0.888	0.658	1.384	0.036
Want no more	1.179	0.265	1.650	0.000	1.483	0.001
Infecund	0.188	0.025	0.691	0.505	0.314	0.027
Respondent's education						
No education (ref)						
Primary	1.785	0.002	1.530	0.003	0.974	0.812
Secondary	2.944	0.000	2.226	0.000	1.208	0.157
Higher	7.942	0.000	3.448	0.000	1.302	0.217
Partner/husband's education						
Never married (ref)						
No education	1.361	0.559	0.930	0.875	0.993	0.981
Primary	1.315	0.593	1.086	0.842	1.115	0.669
Secondary	1.643	0.308	1.482	0.320	1.391	0.178
Higher	3.115	0.025	2.168	0.053	2.136	0.010
Partner employment	1.217	0.137	1.520	0.000	1.078	0.438

Note: ref. refers to the reference category

4.4 Results of the urban and rural logistic regression models

It was noted in Chapter 2 that contraceptive use in Zambia is characterised by urban rural differentials. The data were split into urban and rural women; and logistic regression models were fitted separately to examine whether different variables are

associated with contraceptive use in urban and rural areas of Zambia. The independent and dependent variables are the same as those used in Section 4.3.

Table 4.2 displays the results of the logistic regression model for urban women by year of survey. Age, age squared, education, the number of living children and the desire to have children after two years, were found to be statistically significant. The 2001-2 data are not consistent with the other two data sets for 1996 and 2007. It is difficult to identify the trend from 1996 to 2007, which suggests that the data might be defective. This data defectiveness could be making it difficult to follow the pattern of results over the years. However, 1996 and 2007 data will be used to examine the pattern over the years.

The odds of using contraception for urban women, who desire to have children after two years relative to the odds of urban women who desire to have children within two years, are steadily increasing over time. In 1996, urban women desiring to have children after two years were almost 1.7 times more likely to use contraception than urban women desiring to have children within two years. After ten years, the odds had increased by 76 per cent to almost three times more than the odds of urban women desiring to have children within two years. This shows that urban women's autonomy is increasing, since their desires to delay childbearing are being translated into an increase in the use of contraceptives.

Table 4.2 Urban odds ratios of logistic regression for contraceptive use by women's characteristics and year of survey

	1996		2001-2		2007	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Age	1.227	0.002	1.310	0.000	1.234	0.000
Age-squared	0.996	0.000	0.994	0.000	0.996	0.000
Employment status						
Not working (ref)						
Professional and	0.862	0.255	1.293	0.091	1.230	0.146
Agriculture	0.763	0.494	0.838	0.303	0.534	0.096
Manual workers	1.158	0.506	1.179	0.531	1.058	0.811
Marital status						
Never married (ref)						
Married monogamously	0.999	0.747	2.349	0.152	2.045	0.141
Married polygynously	0.563	0.418	0.705	0.564	0.969	0.949
Number of living	1.267	0.000	1.372	0.000	1.246	0.000
Ethnicity						
Bemba (ref)						
Lozi	1.065	0.768	1.115	0.549	2.067	0.000
Tonga	1.223	0.362	1.365	0.131	1.611	0.001
Tumbuka	1.069	0.693	0.848	0.394	1.087	0.562
Desire for more						
Want within 2 years (ref)						
Want after 2 years	1.671	0.009	2.195	0.000	2.900	0.000
Want but unsure about	1.271	0.360	3.198	0.000	1.934	0.011
Undecided	0.908	0.780	1.514	0.288	2.168	0.002
Want no more	1.171	0.445	1.686	0.011	1.882	0.001
Infecund	0.275	0.094	1.139	0.901	0.343	0.122
Respondent's						
No education (ref)						
Primary	2.143	0.051	0.796	0.473	1.492	0.211
Secondary	3.536	0.003	1.176	0.598	1.976	0.038
Higher	8.454	0.000	2.045	0.068	2.304	0.029
Partner/husband's						
Never married (ref)						
No education	0.773	0.716	0.471	0.372	0.812	0.755
Primary	0.667	0.498	0.541	0.261	1.219	0.652
Secondary	0.842	0.750	0.797	0.664	1.605	0.266
Higher	1.677	0.361	1.069	0.897	1.790	0.199
Partner employment	1.581	0.190	1.990	0.004	0.966	0.869

From Table 4.3, displaying the results of the logistic regression model for rural women: age, age squared, respondent's education, employment status, number of living

children and the desire to have children after two years, are statistically significant. There is an increase in the odds of using contraception for rural women desiring to have children after two years relative to the odds of rural women desiring to have children within two years over time, but this increase is less than that of urban women.

Employment status is significantly associated with the use of contraceptives in rural women, but not in urban women. Since women's autonomy is higher in urban areas than in rural areas, women in urban areas even if they are not working have the same access and control over resources and contraceptives as that of working women; hence, there is no significant difference in the use of contraceptives between working and non-working urban women. On the other hand women's autonomy in rural areas is less than that of urban women because rural women and men alike are bound by traditional practices that do not promote women autonomy which has been found to be an important factor in promoting contraceptive use. Our results are consistent with White and Speizer (2007), they found that in Zambia outreach in the form of a health worker visits can improve family planning services. Since Jejeebhoy (1995) defines women autonomy to include the confidence in interacting with the outside world, Zambian rural women given the opportunity to interact with the outside world (autonomy) can improve their use of modern contraceptives.

Table 4.3 Rural odds ratios of logistic regression for contraceptive use by women's characteristics and year of survey

	1996		2001-2		2007	
	Odds	p-value	Odds ratio	p-value	Odds ratio	p-value
Age	1.127	0.135	1.213	0.000	1.182	0.000
Age-squared	0.997	0.009	0.996	0.000	0.996	0.000
Employment status						
Not working (ref)						
Professional and technical	1.185	0.438	1.531	0.010	1.322	0.056
Agriculture	0.694	0.041	0.735	0.021	0.893	0.237
Manual workers	1.635	0.027	1.710	0.044	1.295	0.217
Marital status						
Never married (ref)						
Married monogamously	2.700	0.007	0.522	0.325	0.895	0.747
Married polygynously	1.429	0.408	0.327	0.081	0.659	0.241
Number of living children	1.341	0.000	1.232	0.000	1.280	0.000
Ethnicity						
Bemba (ref)						
Lozi	1.899	0.002	1.065	0.768	1.082	0.668
Tonga	1.396	0.149	1.223	0.362	1.240	0.102
Tumbuka	1.583	0.185	1.069	0.693	2.088	0.000
Desire for more children						
Want within 2 years (ref)						
Want after 2 years	1.411	0.030	1.741	0.001	1.472	0.009
Want but unsure about	1.780	0.045	1.000	1.000	0.908	0.678
Undecided	1.359	0.410	0.620	0.232	0.942	0.779
Want no more	1.112	0.600	1.752	0.005	1.218	0.220
Infecund		0.000	0.445	0.187	0.257	0.073
Respondent's education						
No education (ref)						
Primary	1.560	0.041	1.807	0.000	0.935	0.567
Secondary	2.568	0.001	2.724	0.000	1.056	0.734
Higher	14.546	0.000	3.719	0.003	0.697	0.482
Partner/husband's education						
Never married (ref)						
No education	0.495	0.049	1.512	0.530	1.057	0.875
Primary	0.489	0.015	1.725	0.379	1.123	0.717
Secondary	0.633	0.126	2.165	0.192	1.303	0.391
Higher		0.000	4.072	0.022	4.560	0.000
Partner employment	1.157	0.364	1.226	0.120	1.023	0.839

4.5 Discussion

This section summarises the results of the logistic model presented in this chapter, taking into account the background characteristics of the women presented in Chapter 3.

Problems were encountered with the 2001-2 fertility data, as shown in Section 3.3. This source shows that fertility had risen by 0.6 births in a space of only five years. From our regression model results, the 2001-2 results show that the 2001-2 data might be defective; therefore, the pattern of results over time will be determined using the 1996 and 2007 results.

The results from the logistic regression shows that education, place of residence (urban/rural), age, number of living children and formal employment) were significantly related to contraceptive use. The bivariate analysis showed that only religion is not significantly related to contraceptive use, while all other variables: age, place of residence, education, number of living children, employment status, marital status, ethnicity desire for more children, husband/partner's education and husband/partner's employment status were associated with contraceptive use.

Urban women are more likely to use contraception compared to rural women, as is clearly shown in Table 3.9 even after controlling for individual characteristics associated with living in urban areas, as shown in Table 4.1. Our findings are fairly consistent with those in the literature. White and Speizer (2007) found that the differences in modern contraceptive use between urban and rural women persist in Zambia. They found that women in urban areas are more likely to use contraception compared to their rural counterparts, which is consistent with our results.

The difference in the use of contraception between rural residence and urban residence is also narrowing down over the period. From Table 4.1 the odds of using contraception by rural women were 46 per cent less than the odds of using contraception by urban women. However, by 2007, the odds of rural women had decreased to 19 per cent less than urban women. This trend shows that there has been an increase in the use of contraception by rural women over this period.

The analysis done in chapter 3 showed that most women use contraception after their first child in Zambia. This is also supported by high levels of adolescent pregnancy, because a lot of adolescents in Zambia do not have reliable sources of information on sex and contraceptive use (Chikovore, Nystrom, Lindmark *et al.* 2003).

Women's greater educational attainment should be inversely related to the number of children they desire, which means that educated women will use contraception more, compared with uneducated or less educated women. This hypothesis is consistent with our findings: that there is a significant association between

contraceptive use and education; and that there is an increase in contraceptive use with an increase in educational attainment.

Our results show that the use of contraception increases with age, and subsequently declines. There is a curvilinear relationship between age and contraceptive use. This is consistent with findings of Shapiro and Tambashe (1994) findings on contraceptive behaviour and abortion among women residing in Kinshasa. They found that younger women in Kinshasa have a lower propensity to use modern contraceptives because of cultural taboos associated with issues of sexuality. Thus, younger women do not want to be seen by their elders taking contraceptives. On the other hand, as women get older, they have a reduced risk of getting pregnant; hence, the lower use of contraception among older women. These women are at a lower risk of getting pregnant, because some of them become widows; a few might have reached menopause; and those who divorce at these old ages may decide not to remarry and hence remain sexually inactive, unlike the younger women.

The employment status of a woman is often considered to be one of the major determinants of her fertility aspirations and behaviour. We found a statistically significant relationship between contraceptive use and employment in professional and technical services and in agriculture. Women employed in agriculture are found to use less contraception compared with unemployed women. Women employed in agriculture comprise women who are self-employed in the agriculture sector. This finding is consistent with the hypothesis that although women's employment is expected to influence their contraceptive behaviour, a distinction must be made between informal and formal sector employment. In the formal sector, women find it difficult to balance the time demands of child care and the time demands of work; hence, these women will be motivated to adopt contraception.

Our results show that contraceptive use is positively associated with the number of surviving children. These findings are consistent with a study done in a Nigerian city by Gbolahan and McCarthy (1986). They found that women who had four or more surviving children were more likely to use contraception than those with fewer than four surviving children. The results show that an increase in the number of living children is associated with an increase in the use of contraceptives. This could be a consequence of the patriarchal society in Zambia, where much of women's autonomy is limited. Reproductive behaviour and contraceptive use may involve women in addition to their partners. Men in these societies often need many children to increase their socio-

political networking and economic advancement. Qualitative studies in Kenya and Zambia showed that women are afraid to ask the husbands for permission to use contraception (Bawah, Akweongo, Simmons *et al.* 1999).

Figure 4.1 shows that there has been an increase in the adoption of female-controlled methods, as shown by the increase in the use of injectables from 1996 to 2007. This increase in the use of injectables is noted for all age groups (see Table 3.12). This increase in the use of injectables is attributed to the approval of depo provera in Zambia after being banned years before in 1982 (Solo, Luhanga and Wohlfahrt 2005).

The common use of condoms by younger women and unmarried women is based on their sexual behaviour. Young and unmarried women are most likely to use the condom as a contraceptive method, because it also protects them from sexually transmitted diseases. The unsteady relationships of young women and unmarried women place them at high risk of being infected by sexually transmitted infections (STIs.)

Section 3.5.5 shows that most married women use the pill compared to other contraceptive methods. Most married women use the pill is a contraceptive method, because it is supposed to be taken daily and it is difficult to hide. These women can use this method without fear of being seen, unlike young women and some unmarried women, who do not want people to know that they are on the pill because they are having sex. Married women do not prefer condoms as a method of contraception, since they are in relationships that are characterised by transparency in personal histories; hence, the reduced condom use among this group (Benefo 2004). The other reason why married women prefer the pill is that it is easily reversible should they consider to have another child (Weldegerima and Denekew 2008).

5 CONCLUSIONS

The purpose of this research has been to examine factors that influence women's choices and the use of contraception in Zambia. The findings show that better-educated women, urbanised women, older women, women with higher numbers of children surviving, and women employed in the formal, professional sector were more likely to use contraceptives than other groups. Despite the high use of contraception by both urban and rural women, the results associate low fertility with urban women. The results show that rural fertility may be responsible for the slow decline of fertility in Zambia.

Our findings suggest that women's education should be promoted, in order to enhance their decision-making autonomy and their ability to pursue goals other than childrearing, if favourable fertility decisions are to be made in Zambia. Formal education is expected to increase the demand for contraceptives, since it emphasises the importance of smaller families, as opposed to extended family interests. In addition, education also opens up communication channels between couples. In order to change the reproductive practices of women in Zambia, there must be an investment in primary and secondary education; there should also be a promotion of gender equity in access to education; and the government must create jobs and facilitate economic growth.

Family planning-focused interventions should be aimed at the factors that currently inhibit women's autonomy. These interventions should also focus on developing functional autonomy through increased employment and improved educational opportunities.

Our results show that an increase in the number of living children is associated with an increase in the use of contraceptives. Awareness campaigns on the advantages of small families targeting men are required in Zambia; since, they would translate into an increased use of contraceptives even at lower parities. This is consistent with Odu, Jadunola and Parakoyi (2005) who point out that in Nigeria The National Population Policy, advocate that special emphasis be given to reaching men with messages on social and economic implication of having too many children. There is a need for family planning programmes that target men, since some methods of contraception, such as male condoms, require the support of husbands and their partners. van Rossem and Meekers (2007) also found that men exposed highly to condoms social marketing communication were more likely than those with low exposure to ever used a condom. This is also consistent with Jadunola and Parakoyi (2005) who argue that service

providers should help break down barriers to men's involvement in reproductive health by making family planning clinics more friendly and ensure that male services information are provided.

There is a need to encourage the greater use of contraception by subsidising modern contraceptives. Our findings show that employment status is associated with the use of contraceptives in rural women which may suggest that women without money can not afford contraceptives. Subsidising contraceptives would increase the adoption of modern contraceptives, since contraception would be available to a lot of women, including those women who do not have enough money, are not employed, or who do not work for cash. Gakidou and Vayena (2007) point out that the widening gap in the use of contraceptives between the poor and rich can be avoided by enhancing supply, which takes into account subsidising modern contraception

Our findings show that there has been a decline in urban fertility, while rural fertility remains constant; and consequently, this moderates the rate of overall fertility in Zambia.

Future studies could also include the factor of migration when analysing factors that influence women's choice and their use of contraceptives, in order to understand why fertility in rural areas has been constant; yet contraceptive use has been increasing.

Our findings show a lower use of contraception by young women. The lower use of contraception by younger women and the fact that contraceptive use is less common before the first birth can be solved by doing more research on the silence, denial and complexity around adolescent sexuality. The results have shown low contraceptive use among the young and the unmarried; and this indicates that efforts must be made to promote contraceptive use amongst these women. This can be achieved by ensuring the availability of modern contraceptives at reproductive clinics, public clinics, public hospitals and other facilities, such as pharmacies. Younger women are at a high risk of reproductive health problems, such as sexually transmitted infections (STIs), pregnancy, pregnancy-related complications, maternal and child mortality. The low use of contraception by younger women suggests that information, education and communication efforts targeted at youth should address these problems, and contraception should be made available to younger women, including those who are still in school.

A study done by Chikovore et al. (2003) showed that in Zimbabwe, and in other African countries like Zambia and Kenya, there is silence and denial in adolescent

sexuality with different stake-holders, such as the church, school authorities, political leaders and parents giving contradictory information on adolescent sexuality. In addition, the research showed that contraceptive use is not tolerated among the youth and unmarried, since it is seen as encouraging promiscuity. Reaching a common consensus by the different stake-holders mentioned above on adolescent sexuality would probably legitimise contraceptive use among the youth.

Condom use patterns shown in Table 3.12 indicate that it is primarily motivated by the need to prevent STIs and the transmission of HIV/AIDS. This is supported by higher use of this method among women most at risk of infection; these women are younger, better educated and unmarried. This higher prevalence in current condom use does not necessarily mean that it will translate into lower HIV infections or prevent pregnancy; hence, the need for more awareness on the consistent use of condoms. Consistent use of condoms is the only way condoms can be an effective method of contraception.

It is therefore recommended that efforts aimed at promoting condom use among the unmarried and young should ensure that condoms are available in places that young people frequent, such as college bathrooms and toilets, hair and beauty salons, in addition to conventional places, like family planning clinics, public clinics, hospitals and private pharmacies.

Another conclusion that can be drawn from this research is that a significant change towards injectables in the period 1996 to 2007 shown in Table 3.12 and Table 4.1 shows the need by women to use a method of contraception that has a long-lasting effect, freedom from fear of forgetting daily pills, convenience and effectiveness, possibility of secrecy and ease of correct use.

Our findings show that religion does not have any significant impact on current contraceptive use. This might be caused by the fact that once a woman has attained better education her religious affiliations will not affect her contraceptive use (Tawiah 1997).

Although it would have been very useful to investigate factors that affect women's use of contraception in Zambia by splitting the data between rural women and urban women and analysing them separately. However, doing so would result in very small samples.

Adding questions on whether women and their spouses approve of family planning and whether couples discuss family planning in Zambian DHS surveys would

be very helpful, since from various studies these factors have been found to be very important in the analysis of contraceptive use.

One of the limitations encountered in the study was the quality of the 2001-2 data. Data interrogation showed that this data set was defective; thereby, compromising the quality of the results produced. The data used in the study were collected from the respondents at a single point in time. The cross-sectional nature of the data makes it difficult to conclude the direction of the association of contraceptive use and its predictors; since there is no direct measurement of the changes that are occurring in the respondents over time.

The research did not employ a multilevel modelling, because community factors are less tangible factors that are difficult to quantify, and also because of the complex nature of multilevel modelling. Determinants of contraception are multilevel in nature, since there are determinants at individual, community, national, and regional levels. Consequently, analysing these factors at individual levels only could introduce bias.

The findings of this research in general suggest that female autonomy is the major factor that determines the increased use of contraception in Zambia. This was established by taking factors, such as education and employment as proxies of female autonomy. Autonomous women are in a good position to make their own reproductive decisions, and are able to obtain higher levels of antenatal care; thereby, increasing child survival; and hence, the need to use contraception more than non-autonomous women. In our study, this was shown by a significant association between contraceptive use and the number of living children. Results from urban and rural logistic regression models show that urban women's autonomy is higher than that of rural women, since urban women's desires to delay child bearing are being translated into the increased use of contraception.

This shows the importance of female autonomy in determining an increased use of contraception. This rural-urban differential suggests that the government and policy makers, when planning should note the discrepancy between rural and urban female autonomy.

Future research on determinants of contraception in Zambia may include other predictors, like differences in age between couples, age at marriage, as these are proxies' in measuring female autonomy. Establishing the relationship between fertility and contraceptive use is something that can be pursued in the future.

Future research could also look at the determinants analysed in this study at a community level, and also add factors, such as community-level cultural beliefs, the quality and presence of reproductive health facilities, macro-economic factors, and the infrastructure of the community. A greater understanding of these factors, in association with contraceptive use, could assist in informing the development of community programmes that would assist in increasing contraceptive use. This understanding would also be essential in understanding communities that are in need of development community-level programs that could increase contraceptive use.

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APPENDIX A1. Logistic regression results for all the women

Table A1 Logistic regression results for the 1996 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf. interval]	
Age	0.172	0.049	3.490	0.001	0.075	0.269
Age-squared	-0.004	0.001	-4.860	0.000	-0.005	-0.002
Residence	-0.573	0.118	-4.860	0.000	-0.806	-0.340
Professional and	-0.060	0.110	-0.540	0.588	-0.278	0.158
Agriculture	-0.427	0.154	-2.770	0.006	-0.732	-0.123
Manual workers	0.261	0.161	1.620	0.108	-0.058	0.580
Married	-0.274	0.543	-0.500	0.615	-1.346	0.798
Married polygynously	-0.886	0.551	-1.610	0.110	-1.973	0.202
Number of living	0.247	0.032	7.830	0.000	0.185	0.309
Lozi	0.254	0.157	1.620	0.107	-0.055	0.564
Tonga	0.248	0.160	1.550	0.122	-0.067	0.564
Tumbuka	0.191	0.162	1.180	0.238	-0.128	0.510
Want after 2 years	0.460	0.130	3.550	0.001	0.204	0.716
Want but unsure	0.365	0.197	1.850	0.066	-0.025	0.754
Undecided	0.062	0.263	0.240	0.813	-0.457	0.581
Wants no more	0.165	0.148	1.120	0.265	-0.126	0.456
Infecund	-1.669	0.737	-2.270	0.025	-3.124	-0.214
Primary	0.579	0.183	3.170	0.002	0.219	0.940
Secondary	1.080	0.204	5.290	0.000	0.676	1.483
Higher	2.072	0.280	7.400	0.000	1.519	2.625
No education	0.308	0.717	0.590	0.559	0.481	3.850
Primary	0.274	0.672	0.540	0.593	0.479	3.611
Secondary	0.497	0.798	1.020	0.308	0.630	4.287
Higher	1.136	0.501	2.270	0.025	0.147	2.126
Partner employment	0.197	0.131	1.500	0.137	-0.063	0.456
_cons	-5.135	0.667	-7.700	0.000	-6.452	-3.818

Table A2 Logistic regression results for the 2001-2 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% conf. interval]	
Age	0.225	0.037	6.070	0.000	0.152	0.298
Age-squared	-0.005	0.001	-7.880	0.000	-0.006	-0.004
Residence	-0.412	0.091	-4.510	0.000	-0.592	-0.231
Professional and	0.278	0.111	2.520	0.013	0.060	0.496
Agriculture	-0.267	0.103	-2.600	0.010	-0.469	-0.064
Manual workers	0.302	0.186	1.620	0.107	-0.066	0.669
Married	0.080	0.445	0.180	0.857	-0.799	0.959
Married polygynously	-0.728	0.442	-1.650	0.101	-1.600	0.143
Number of living	0.260	0.027	9.630	0.000	0.207	0.313
Lozi	0.143	0.157	0.910	0.364	-0.167	0.452
Tonga	0.223	0.126	1.770	0.079	-0.026	0.471
Tumbuka	-0.082	0.133	-0.610	0.540	-0.345	0.181
Want after 2 years	0.629	0.125	5.050	0.000	0.383	0.876
Want but unsure	0.562	0.170	3.300	0.001	0.226	0.897
Undecided	-0.119	0.269	-0.440	0.658	-0.650	0.411
Wants no more	0.501	0.138	3.620	0.000	0.228	0.774
Infecund	-0.369	0.553	-0.670	0.505	-1.461	0.722
Primary	0.425	0.143	2.960	0.003	0.142	0.708
Secondary	0.800	0.158	5.070	0.000	0.488	1.112
Higher	1.238	0.236	5.250	0.000	0.772	1.703
No education	-0.072	0.460	-0.160	0.875	-0.980	0.836
Primary	0.082	0.411	0.200	0.842	-0.729	0.893
Secondary	0.393	0.394	1.000	0.320	-0.385	1.171
Higher	0.774	0.397	1.950	0.053	-0.010	1.558
Partner employment	0.419	0.107	3.910	0.000	0.207	0.630
_cons	-5.495	0.548	-10.020	0.000	-6.578	-4.413

Table A3 Logistic regression results for the 2007 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf. Interval]	
Age	0.177	0.032	5.590	0.000	0.115	0.239
Age-squared	-0.004	0.001	-7.510	0.000	-0.005	-0.003
Residence	-0.208	0.091	-2.280	0.023	-0.388	-0.029
Professional and technical	0.234	0.097	2.410	0.017	0.043	0.424
Agriculture	-0.167	0.091	-1.850	0.066	-0.346	0.011
Manual workers	0.157	0.157	1.000	0.316	-0.151	0.465
Married monogamously	0.309	0.278	1.110	0.266	-0.237	0.856
Married polygynously	-0.170	0.288	-0.590	0.557	-0.737	0.398
Number of living children	0.229	0.023	9.830	0.000	0.183	0.275
Lozi	0.376	0.127	2.960	0.003	0.126	0.626
Tonga	0.291	0.097	2.990	0.003	0.099	0.482
Tumbuka	0.462	0.120	3.840	0.000	0.226	0.699
Want after 2 years	0.648	0.117	5.540	0.000	0.418	0.878
Want but unsure about timing	0.220	0.174	1.270	0.207	-0.122	0.562
Undecided	0.325	0.154	2.110	0.036	0.021	0.629
Wants no more	0.394	0.121	3.250	0.001	0.155	0.633
Infecund	-1.160	0.521	-2.230	0.027	-2.184	-0.135
Primary	-0.026	0.109	-0.240	0.812	-0.240	0.188
Secondary	0.189	0.133	1.420	0.157	-0.073	0.451
Higher	0.264	0.213	1.240	0.217	-0.156	0.683
No education	-0.007	0.290	-0.020	0.981	-0.578	0.564
Primary	0.109	0.254	0.430	0.669	-0.392	0.609
Secondary	0.330	0.244	1.350	0.178	-0.151	0.811
Higher	0.759	0.291	2.610	0.010	0.186	1.332
Partner employment	0.075	0.097	0.780	0.438	-0.116	0.267
_cons	-4.242	0.472	-8.990	0.000	-5.171	-3.313

APPENDIX A2. Logistic regression results for urban and rural women

Table A4 Logistic regression results for urban women for the 1996 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf.	interval]
Age	0.205	0.063	3.250	0.002	0.079	0.330
Age-squared	-0.004	0.001	-4.140	0.000	-0.006	-0.002
Residence	(omitted)	0.000	0.000	0.000	0.000	0.000
Professional and technical	-0.149	0.130	-1.150	0.255	-0.407	0.110
Agriculture	-0.271	0.394	-0.690	0.494	-1.056	0.514
Manual workers	0.147	0.219	0.670	0.506	-0.290	0.583
Married monogamously	-0.001	0.748	0.000	0.998	-1.494	1.491
Married polygynously	-0.575	0.743	-0.770	0.441	-2.056	0.906
Number of living children	0.237	0.043	5.500	0.000	0.151	0.323
Lozi	0.063	0.212	0.300	0.768	-0.361	0.486
Tonga	0.201	0.219	0.920	0.362	-0.236	0.638
Tumbuka	0.067	0.168	0.400	0.693	-0.268	0.402
Want after 2 years	0.514	0.192	2.680	0.009	0.131	0.896
Want but unsure about timing	0.240	0.261	0.920	0.360	-0.280	0.760
Undecided	-0.097	0.345	-0.280	0.780	-0.784	0.591
Wants no more	0.158	0.205	0.770	0.445	-0.252	0.567
Infecund	-1.293	0.761	-1.700	0.094	-2.810	0.225
Primary	0.762	0.385	1.980	0.051	-0.005	1.529
Secondary	1.263	0.411	3.070	0.003	0.443	2.083
Higher	2.135	0.469	4.550	0.000	1.199	3.070
No education	-0.258	0.707	-0.370	0.716	-1.667	1.151
Primary	-0.404	0.594	-0.680	0.498	-1.588	0.780
Secondary	-0.172	0.539	-0.320	0.750	-1.247	0.903
Higher	0.517	0.562	0.920	0.361	-0.603	1.637
Partner employment	0.458	0.346	1.320	0.190	-0.233	1.149
_cons	-5.737	0.831	-6.900	0.000	-7.395	-4.079

Table A5 Logistic regression results for rural women for the 1996 survey

Contraceptive use	coefficien	Std. Err.	t	P>t	[95% Conf.	interval]
Age	0.120	0.079	1.510	0.135	-0.038	0.277
Age-squared	-0.003	0.001	-2.680	0.009	-0.006	-0.001
Residence	(omitted)	0.000	0.000	0.000	0.000	0.000
Professional and technical	0.170	0.218	0.780	0.438	-0.263	0.603
Agriculture	-0.365	0.176	-2.070	0.041	-0.716	-0.015
Manual workers	0.492	0.218	2.250	0.027	0.057	0.926
Married monogamously	0.993	0.362	2.740	0.007	0.273	1.714
Married polygynously	0.357	0.429	0.830	0.408	-0.496	1.211
Number of living children	0.293	0.044	6.670	0.000	0.206	0.381
Lozi	0.641	0.201	3.190	0.002	0.242	1.041
Tonga	0.334	0.229	1.460	0.149	-0.122	0.789
Tumbuka	0.459	0.343	1.340	0.185	-0.224	1.142
Want after 2 years	0.344	0.156	2.210	0.030	0.034	0.654
Want but unsure about timing	0.576	0.283	2.040	0.045	0.013	1.140
Undecided	0.307	0.371	0.830	0.410	-0.430	1.044
Wants no more	0.106	0.202	0.530	0.600	-0.295	0.508
Infecund	(omitted)	0.000	0.000	0.000	0.000	0.000
Primary	0.445	0.214	2.080	0.041	0.019	0.871
Secondary	0.943	0.285	3.310	0.001	0.377	1.509
Higher	2.677	0.611	4.380	0.000	1.463	3.892
No education	-0.703	0.353	-1.990	0.049	-1.405	-0.002
Primary	-0.715	0.289	-2.470	0.015	-1.289	-0.140
Secondary	-0.457	0.296	-1.540	0.126	-1.045	0.131
Higher	(omitted)	0.000	0.000	0.000	0.000	0.000
Partner employment	0.146	0.160	0.910	0.364	-0.172	0.464
_cons	-4.997	1.108	-4.510	0.000	-7.200	-2.794

Table A6 Logistic regression results for urban women for the 2001-2 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf.	interval]
Age	0.270	0.057	4.740	0.000	0.156	0.384
Age-squared	-0.006	0.001	-5.850	0.000	-0.008	-0.004
Professional and technical	0.257	0.149	1.720	0.091	-0.043	0.557
Agriculture	-0.177	0.170	-1.040	0.303	-0.518	0.164
Manual workers	0.165	0.262	0.630	0.531	-0.360	0.689
Married monogamously	0.854	0.588	1.450	0.152	-0.326	2.033
Married polygynously	-0.349	0.601	-0.580	0.564	-1.554	0.855
Number of living children	0.316	0.044	7.160	0.000	0.228	0.405
Lozi	0.109	0.180	0.600	0.549	-0.253	0.471
Tonga	0.311	0.203	1.530	0.131	-0.096	0.719
Tumbuka	-0.165	0.192	-0.860	0.394	-0.551	0.220
Want after 2 years	0.786	0.182	4.320	0.000	0.421	1.151
Want but unsure about timing	1.163	0.243	4.790	0.000	0.676	1.649
Undecided	0.415	0.386	1.070	0.288	-0.360	1.189
Wants no more	0.522	0.197	2.650	0.011	0.127	0.918
Infecund	0.130	1.039	0.130	0.901	-1.952	2.213
Primary	-0.228	0.315	-0.720	0.473	-0.859	0.404
Secondary	0.162	0.305	0.530	0.598	-0.451	0.774
Higher	0.715	0.384	1.860	0.068	-0.055	1.485
No education	-0.752	0.836	-0.900	0.372	-2.428	0.924
Primary	-0.615	0.541	-1.140	0.261	-1.700	0.470
Secondary	-0.227	0.520	-0.440	0.664	-1.269	0.815
Higher	0.067	0.514	0.130	0.897	-0.965	1.098
Partner employment	0.688	0.231	2.980	0.004	0.225	1.152
_cons	-5.915	0.939	-6.300	0.000	-7.797	-4.033

Table A7 Logistic regression results for rural women for the 2001-2 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf.	interval]
Age	0.193	0.046	4.190	0.000	0.102	0.285
Age-squared	-0.004	0.001	-5.700	0.000	-0.005	-0.003
Professional and technical	0.426	0.162	2.620	0.010	0.104	0.748
Agriculture	-0.308	0.131	-2.350	0.021	-0.567	-0.048
Manual workers	0.537	0.263	2.040	0.044	0.016	1.057
Married monogamously	-0.650	0.657	-0.990	0.325	-1.952	0.652
Married polygynously	-1.118	0.634	-1.760	0.081	-2.375	0.139
Number of living children	0.208	0.036	5.840	0.000	0.138	0.279
Lozi	0.175	0.245	0.710	0.477	-0.311	0.661
Tonga	0.137	0.162	0.850	0.399	-0.183	0.457
Tumbuka	-0.022	0.182	-0.120	0.903	-0.384	0.339
Want after 2 years	0.554	0.167	3.320	0.001	0.223	0.885
Want but unsure about timing	0.000	0.247	0.000	1.000	-0.489	0.489
Undecided	-0.478	0.397	-1.200	0.232	-1.265	0.309
Wants no more	0.561	0.194	2.890	0.005	0.176	0.945
Infecund	-0.809	0.610	-1.330	0.187	-2.017	0.399
Primary	0.592	0.164	3.610	0.000	0.267	0.916
Secondary	1.002	0.203	4.940	0.000	0.600	1.404
Higher	1.314	0.433	3.030	0.003	0.455	2.172
No education	0.413	0.656	0.630	0.530	-0.886	1.713
Primary	0.545	0.618	0.880	0.379	-0.678	1.769
Secondary	0.772	0.588	1.310	0.192	-0.393	1.938
Higher	1.404	0.603	2.330	0.022	0.209	2.599
Partner employment	0.204	0.130	1.570	0.120	-0.054	0.462
_cons	-5.277	0.612	-8.620	0.000	-6.491	-4.064

Table A8 Logistic regression results for urban women for the 2007 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf. interval]	
Age	0.210	0.048	4.370	0.000	0.115	0.305
Age-squared	-0.004	0.001	-5.350	0.000	-0.006	-0.003
Professional and technical	0.207	0.141	1.470	0.146	-0.073	0.488
Agriculture	-0.627	0.373	-1.680	0.096	-1.367	0.113
Manual workers	0.057	0.236	0.240	0.811	-0.412	0.525
Married monogamously	0.716	0.482	1.480	0.141	-0.240	1.671
Married polygynously	-0.032	0.495	-0.060	0.949	-1.012	0.949
Number of living children	0.220	0.035	6.230	0.000	0.150	0.290
Lozi	0.726	0.192	3.770	0.000	0.345	1.108
Tonga	0.477	0.142	3.360	0.001	0.196	0.759
Tumbuka	0.084	0.144	0.580	0.562	-0.201	0.369
Want after 2 years	1.065	0.190	5.590	0.000	0.687	1.442
Want but unsure about timing	0.660	0.256	2.580	0.011	0.153	1.166
Undecided	0.774	0.241	3.210	0.002	0.296	1.252
Wants no more	0.633	0.187	3.380	0.001	0.261	1.004
Infecund	-1.071	0.688	-1.560	0.122	-2.435	0.293
Primary	0.400	0.318	1.260	0.211	-0.231	1.030
Secondary	0.681	0.325	2.100	0.038	0.037	1.325
Higher	0.835	0.377	2.220	0.029	0.088	1.581
No education	-0.208	0.666	-0.310	0.755	-1.528	1.112
Primary	0.198	0.438	0.450	0.652	-0.670	1.067
Secondary	0.473	0.423	1.120	0.266	-0.365	1.311
Higher	0.582	0.451	1.290	0.199	-0.311	1.476
Partner employment	-0.034	0.208	-0.170	0.869	-0.446	0.378
_cons	-5.880	0.794	-7.400	0.000	-7.454	-4.306

Table A9 Logistic regression results for rural women for the 2007 survey

Contraceptive use	coefficient	Std. Err.	t	P>t	[95% Conf. interval]	
Age	0.167	0.044	3.780	0.000	0.080	0.254
Age-squared	-0.004	0.001	-5.330	0.000	-0.005	-0.002
Professional and technical	0.279	0.145	1.920	0.056	-0.007	0.565
Agriculture	-0.113	0.095	-1.190	0.237	-0.301	0.075
Manual workers	0.258	0.209	1.240	0.217	-0.153	0.670
Married monogamously	-0.111	0.345	-0.320	0.747	-0.791	0.569
Married polygynously	-0.417	0.355	-1.170	0.241	-1.116	0.283
Number of living children	0.247	0.032	7.690	0.000	0.184	0.310
Lozi	0.078	0.182	0.430	0.668	-0.282	0.438
Tonga	0.215	0.131	1.640	0.102	-0.043	0.473
Tumbuka	0.736	0.174	4.230	0.000	0.393	1.079
Want after 2 years	0.387	0.147	2.630	0.009	0.097	0.676
Want but unsure about timing	-0.096	0.231	-0.420	0.678	-0.553	0.360
Undecided	-0.060	0.212	-0.280	0.779	-0.478	0.359
Wants no more	0.197	0.160	1.230	0.220	-0.119	0.514
Infecund	-1.358	0.753	-1.800	0.073	-2.843	0.126
Primary	-0.067	0.117	-0.570	0.567	-0.298	0.164
Secondary	0.055	0.160	0.340	0.734	-0.261	0.370
Higher	-0.361	0.512	-0.700	0.482	-1.371	0.650
No education	0.056	0.354	0.160	0.875	-0.642	0.754
Primary	0.116	0.321	0.360	0.717	-0.516	0.749
Secondary	0.265	0.308	0.860	0.391	-0.343	0.872
Higher	1.517	0.392	3.870	0.000	0.745	2.290
Partner employment	0.023	0.112	0.200	0.839	-0.199	0.244
_cons	-3.658	0.648	-5.640	0.000	-4.936	-2.379